

GENERAC®

POWER SYSTEMS, INC.

Owner's Manual

GUARDIAN™
by GENERAC POWER SYSTEMS

Liquid-cooled, Prepackaged
Standby Generators

Model Numbers

(Natural Gas)

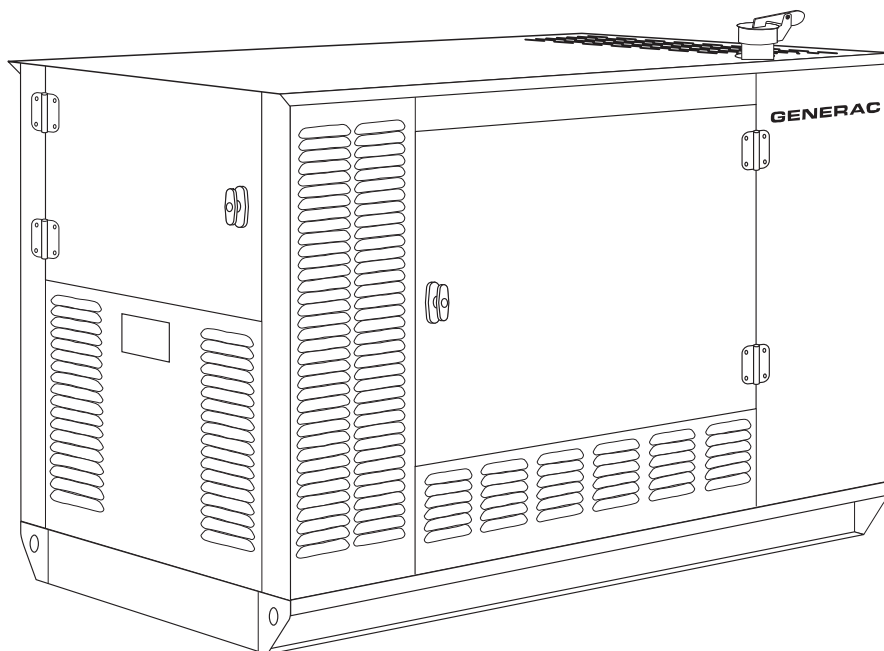
| | |
|----------|----------|
| 004090-2 | 004091-2 |
| 004092-2 | 004093-2 |
| 004094-2 | 004095-2 |
| 004096-2 | 004097-2 |

004474-0 (w/TS)

(Liquid Propane Vapor)

| | |
|----------|----------|
| 004124-1 | 004125-1 |
| 004126-1 | 004127-1 |
| 004128-1 | 004130-1 |
| 004131-1 | |

004475-0 (w/TS)



**ONLY QUALIFIED ELECTRICIANS OR CONTRACTORS
SHOULD ATTEMPT INSTALLATION!!**

INTRODUCTION

Thank you for purchasing this model of the standby generator set product line by Generac Power Systems.

Every effort was expended to make sure that the information and instructions in this manual were both accurate and current at the time the manual was written. However, the manufacturer reserves the right to change, alter or otherwise improve this product(s) at any time without prior notice.

■ READ THIS MANUAL THOROUGHLY

If you do not understand any portion of this manual, contact Generac or your nearest Generac Authorized Service Dealer for starting, operating and servicing procedures.

Throughout this publication, and on tags and decals affixed to the generator, DANGER, WARNING, CAUTION and NOTE blocks are used to alert you to special instruction about a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe them carefully. Their definitions are as follows:



After this heading, you can read instructions that, if not strictly complied with, will result in personal injury or property damage.



After this heading, you can read instructions that, if not strictly complied with, may result in personal injury or property damage.




After this heading, you can read instructions that, if not strictly complied with, could result in damage to equipment and/or property.

NOTE:

After this heading, you can read explanatory statements that require special emphasis.

These safety warnings cannot eliminate the hazards that they indicate. Common sense and strict compliance with the special instructions while performing the service are essential to preventing accidents.

Four commonly used safety symbols accompany the DANGER, WARNING and CAUTION blocks. The type of information each indicates is as follows:

 This symbol points out important safety information that, if not followed, could endanger personal safety and/or property of you and others.

 This symbol points out potential explosion hazard.

 This symbol points out potential fire hazard.

 This symbol points out potential electrical shock hazard.

The operator is responsible for proper and safe use of the equipment. We strongly recommend that the operator read this Owner's Manual and thoroughly understand all instructions before using this equipment. We also strongly recommend instructing other users to properly start and operate the unit. This prepares them if they need to operate the equipment in an emergency.

■ OPERATION AND MAINTENANCE

It is the operator's responsibility to perform all safety checks, to make sure that all maintenance for safe operation is performed promptly, and to have the equipment checked periodically by a Generac Authorized Service Dealer. Normal maintenance service and replacement of parts are the responsibility of the owner/operator and, as such, are not considered defects in materials or workmanship within the terms of the warranty. Individual operating habits and usage contribute to the need for maintenance service.

Proper maintenance and care of your generator ensure a minimum number of problems and keep operating expenses at a minimum. See your Generac Authorized Service Dealer for service aids and accessories.

Operating instructions presented in this manual assume that the standby electric system has been installed by a Generac Authorized Service Dealer or other competent, qualified contractor. Installation of this equipment is not a "do-it-yourself" project.

■ HOW TO OBTAIN SERVICE

When your generator requires servicing or repairs, simply contact a Generac Authorized Service Dealer for assistance. Service technicians are factory-trained and are capable of handling all of your service needs.

When contacting a Generac Authorized Service Dealer or the factory about parts and service, always supply the complete model number of your unit as given on the front cover of this manual or on the DATA CARD affixed to the unit.

AUTHORIZED SERVICE DEALER LOCATION

To locate the GENERAC AUTHORIZED SERVICE DEALER nearest you, please call this number:

1-800-333-1322

OR

Locate us on the web at:

www.generac.com

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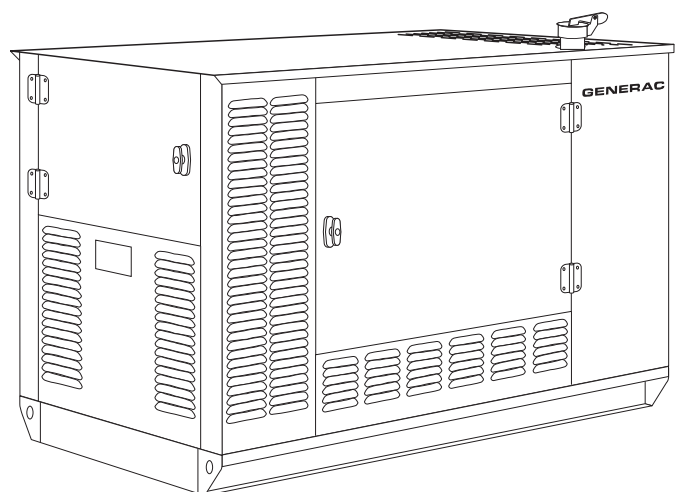
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Figure 1- Water Cooled Emergency Power System





Important Safety Instructions

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

⚠ SAVE THESE INSTRUCTIONS – The manufacturer suggests that these rules for safe operation be copied and posted in potential hazard areas. Safety should be stressed to all operators, potential operators, and service and repair technicians for this equipment. **⚠**

⚠ SAVE THESE INSTRUCTIONS – This manual contains important instructions that should be followed during installation and maintenance of the generator and batteries. **⚠**

⚠ WARNING: ⚠
The engine exhaust from this product contains chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

⚠ WARNING: ⚠
This product contains or emits chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Study these SAFETY RULES carefully before installing, operating or servicing this equipment. Become familiar with this *Owner's Manual* and with the unit. The generator can operate safely, efficiently and reliably only if it is properly installed, operated and maintained. Many accidents are caused by failing to follow simple and fundamental rules or precautions.

Generac cannot possibly anticipate every possible circumstance that might involve a hazard. The warnings in this manual, and on tags and decals affixed to the unit are, therefore, not all-inclusive. If you use a procedure, work method or operating technique that Generac does not specifically recommend, you must satisfy yourself that it is safe for you and others. You also must make sure the procedure, work method or operating technique that you choose does not render the generator unsafe.

⚠ DANGER ⚠

⚠ Despite the safe design of this generator, operating this equipment imprudently, neglecting its maintenance or being careless can cause possible injury or death. Permit only responsible and capable persons to install, operate or maintain this equipment.

⚠ Potentially lethal voltages are generated by these machines. Ensure all steps are taken to render the machine safe before attempting to work on the generator.

⚠ Parts of the generator are rotating and/or hot during operation. Exercise care near running generators.

⚠ GENERAL HAZARDS ⚠

- For safety reasons, Generac recommends that this equipment be installed, serviced and repaired by a Generac Authorized Service Dealer or other competent, qualified electrician or installation technician who is familiar with applicable codes, standards and regulations. The operator also must comply with all such codes, standards and regulations.
- Installation, operation, servicing and repair of this (and related) equipment must always comply with applicable codes, standards, laws and regulations. Adhere strictly to local, state and national electrical and building codes. Comply with regulations the Occupational Safety and Health Administration (OSHA) has established. Also, ensure that the generator is installed, operated and serviced in accordance with the manufacturer's instructions and recommendations. Following installation, you must not do anything that might render the unit unsafe or in non-compliance with the aforementioned codes, standards, laws and regulations.
- The engine exhaust fumes contain carbon monoxide gas, which can be DEADLY. This dangerous gas, if breathed in sufficient concentrations, can cause unconsciousness or even death. For that reason, adequate ventilation must be provided. Exhaust gases must be piped safely away from any building or enclosure that houses the generator to an area where people, animals, etc., will not be harmed. This exhaust system must be installed properly, in strict compliance with applicable codes and standards.
- Keep hands, feet, clothing, etc., away from drive belts, fans, and other moving or hot parts. Never remove any drive belt or fan guard while the unit is operating.
- Adequate, unobstructed flow of cooling and ventilating air is critical in any room or building housing the generator to prevent buildup of explosive gases and to ensure correct generator operation. Do not alter the installation or permit even partial blockage of ventilation provisions, as this can seriously affect safe operation of the generator.
- Keep the area around the generator clean and uncluttered. Remove any materials that could become hazardous.
- When working on this equipment, remain alert at all times. Never work on the equipment when you are physically or mentally fatigued.



- Inspect the generator regularly, and promptly repair or replace all worn, damaged or defective parts using only factory-approved parts.
- Before performing any maintenance on the generator, disconnect its battery cables to prevent accidental start-up. Disconnect the cable from the battery post indicated by a NEGATIVE, NEG or (-) first. Reconnect that cable last.
- Never use the generator or any of its parts as a step. Stepping on the unit can stress and break parts, and may result in dangerous operating conditions from leaking exhaust gases, fuel leakage, oil leakage, etc.
- Generators installed with an automatic transfer switch will crank and start automatically when normal (utility) source voltage is removed or is below an acceptable preset level. To prevent such automatic start-up and possible injury to personnel, disable the generator's automatic start circuit (battery cables, etc.) before working on or around the unit. Then, place a "Do Not Operate" tag on the generator control panel and on the transfer switch.
- In case of accident caused by electric shock, immediately shut down the source of electrical power. If this is not possible, attempt to free the victim from the live conductor. **AVOID DIRECT CONTACT WITH THE VICTIM.** Use a nonconducting implement, such as a dry rope or board, to free the victim from the live conductor. If the victim is unconscious, apply first aid and get immediate medical help.
- Never wear jewelry when working on this equipment. Jewelry can conduct electricity resulting in electric shock, or may get caught in moving components causing injury.

ELECTRICAL HAZARDS

- All generators covered by this manual produce dangerous electrical voltages and can cause fatal electrical shock. Utility power delivers extremely high and dangerous voltages to the transfer switch as well as the standby generator. Avoid contact with bare wires, terminals, connections, etc., on the generator as well as the transfer switch, if applicable. Ensure all appropriate covers, guards and barriers are in place before operating the generator. If you must work around an operating unit, stand on an insulated, dry surface to reduce shock hazard.
- Do not handle any kind of electrical device while standing in water, while barefoot, or while hands or feet are wet. **DANGEROUS ELECTRICAL SHOCK MAY RESULT.**
- If people must stand on metal or concrete while installing, operating, servicing, adjusting or repairing this equipment, place insulative mats over a dry wooden platform. Work on the equipment only while standing on such insulative mats.
- The National Electrical Code (NEC), Article 250 requires the frame and external electrically conductive parts of the generator to be connected to an approved earth ground and/or grounding rods. This grounding will help prevent dangerous electrical shock that might be caused by a ground fault condition in the generator set or by static electricity. Never disconnect the ground wire.
- Wire gauge sizes of electrical wiring, cables and cord sets must be adequate to handle the maximum electrical current (ampacity) to which they will be subjected.
- Before installing or servicing this (and related) equipment, make sure that all power voltage supplies are positively turned off at their source. Failure to do so will result in hazardous and possibly fatal electrical shock.
- Connecting this unit to an electrical system normally supplied by an electric utility shall be by means of a transfer switch so as to isolate the generator electric system from the electric utility distribution system when the generator is operating. Failure to isolate the two electric system power sources from each other by such means will result in damage to the generator and may also result in injury or death to utility power workers due to backfeed of electrical energy.

FIRE HAZARDS

- Keep a fire extinguisher near the generator at all times. Do NOT use any carbon tetra-chloride type extinguisher. Its fumes are toxic, and the liquid can deteriorate wiring insulation. Keep the extinguisher properly charged and be familiar with its use. If you have any question pertaining to fire extinguishers, consult your local fire department.

EXPLOSION HAZARDS

- Properly ventilate any room or building housing the generator to prevent build-up of explosive gas.
- Do not smoke around the generator. Wipe up any fuel or oil spills immediately. Ensure that no combustible materials are left in the generator compartment, or on or near the generator, as FIRE or EXPLOSION may result. Keep the area surrounding the generator clean and free from debris.
- Generac generator sets may operate using one of several types of fuels. All fuel types are potentially FLAMMABLE and/or EXPLOSIVE and should be handled with care. Comply with all laws regulating the storage and handling of fuels. Inspect the unit's fuel system frequently and correct any leaks immediately. Fuel supply lines must be properly installed, purged and leak tested according to applicable fuel-gas codes before placing this equipment into service.
- Diesel fuels are highly FLAMMABLE. Gaseous fluids such as natural gas and liquid propane (LP) gas are extremely EXPLOSIVE. Natural gas is lighter than air, and LP gas is heavier than air; install leak detectors accordingly.

GENERATOR

This equipment is an water-cooled, engine-driven generator set. The generator is designed to supply electrical power that operates critical electrical loads during utility power failure. The unit has been factory-installed in a weather resistant, all metal sound attenuated enclosure and is intended for outdoor installation only. Use this generator as a source of electrical power for the operation of 120 and/or 240 volts, single or 3-phase loads, or 120 and/or 208 volts, 3-phase loads.

These models are available. They are rated as follows:

- Model 004090:** Provides 10,000 watts (10 kW) of 1-phase power.
- Model 004091:** Provides 10,000 watts (10 kW) of 3-phase power.
- Model 004124:** Provides 10,000 watts (10 kW) of 1-phase power.
- Model 004125:** Provides 10,000 watts (10 kW) of 3-phase power.
- Model 004092:** Provides 15,000 watts (15 kW) of 1 phase power.
- Model 004093:** Provides 15,000 watts (15 kW) of 3 phase power.
- Model 004126:** Provides 15,000 watts (15 kW) of 1 phase power.
- Model 004127:** Provides 15,000 watts (15 kW) of 3 phase power.
- Model 004094:** Provides 20,000 watts (20 kW) of 1-phase power.
- Model 004095:** Provides 20,000 watts (20 kW) of 3-phase power.
- Model 004128:** Provides 20,000 watts (20 kW) of 1-phase power.
- Model 004096:** Provides 25,000 watts (25 kW) of 1 phase power.
- Model 004097:** Provides 25,000 watts (25 kW) of 3 phase power.
- Model 004130:** Provides 25,000 watts (25 kW) of 1 phase power.
- Model 004131:** Provides 25,000 watts (25 kW) of 3 phase power.
- Model 004474:** Provides 25,000 watts (25 kW) of 1 phase power.
- Model 004475:** Provides 25,000 watts (25 kW) of 1 phase power.



WARNING: If this generator is used to power electrical load circuits normally powered by a utility power source, you are required by code to install a transfer switch. The transfer switch must effectively isolate the electric system from the utility distribution system when the generator is operating (NEC 701). Failure to isolate an electrical system by such means results in damage to the generator and may also result in injury or even death to utility power workers due to back-feed of electrical energy.

AUTOMATIC SYSTEM OPERATION

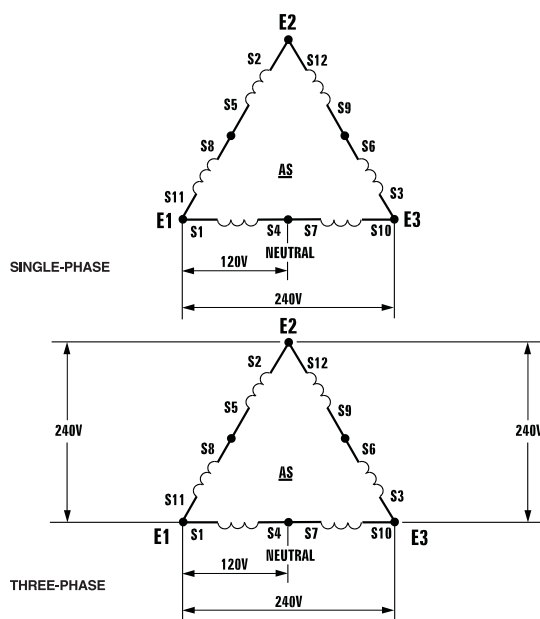
When this generator along with its transfer switch has been installed and interconnected, a circuit board in the generator panel constantly monitors utility power source voltage. Should that voltage drop below a preset value, and remain at such a low state for a preset amount of time, the generator cranks and starts. After the generator starts, the transfer switch transfers load circuits so the generator can power them.

When utility source voltage has been restored, the switch re-transfers back to the utility source voltage and the generator then shuts down.

GENERATOR AC CONNECTION SYSTEMS

The generator was shipped from the factory with its stator AC output leads connected in one of the “Delta” configurations, as shown in Figure 2. This type of connection system will supply a 120 and/or 240 volts, 1 or 3-phase output as shown in the illustration.

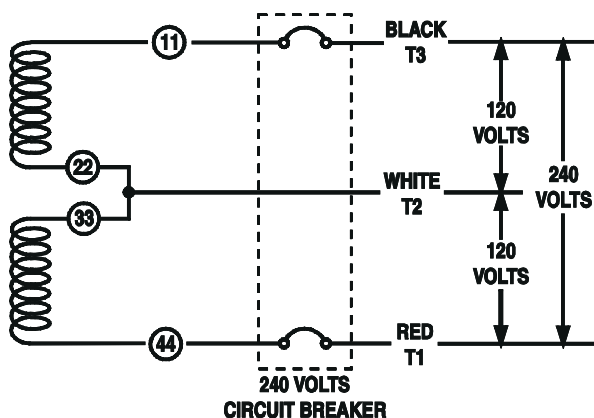
Figure 2 - Generator AC Connection System



If, however, load voltage requires 120/208 volts, 3-phase output, generator will require reconnecting of the stator’s output leads. This task should only be performed by a qualified Generac service technician. Refer to the installation manual (Part No. 079699) for details.

Figure 3 represents a single-phase, 3-wire generator AC connection system. The stator assembly in this system consists of a pair of stationary windings, with two leads brought out of each winding. Each single winding can supply 120 volts AC, 60 Hertz. When the two windings are connected in series, a 240 volts, 60 Hertz AC output results. Typically the two "hot" leads in the circuit are Wires No. 11 and 44. The "Neutral" leads are the junction of Wires 22 and 33.

Figure 3 - Generator AC Connection System



MAIN CIRCUIT BREAKER

The generator's main circuit breaker is included with the unit as shipped from the factory. The breaker for each unit is described in Figure 5 below.

GENERATOR FUEL SYSTEM

Your unit has been factory tested and adjusted using a natural gas fuel system. If propane (LP) gas is preferred, contact an authorized service dealer.

Figure 5 - Main Circuit Breaker

| Model | Rating | Phase | Actual Current | C/B Rating* | % over rating | Circuit Breaker |
|----------|--------|-------|----------------|-------------|---------------|-----------------|
| 004090-2 | 10,000 | 1 | 41.7 | 50 | 120% | 50A BQ2 |
| 004091-2 | 10,000 | 3 | 30.1 | 40 | 133% | 40A BQ3 |
| 004124-1 | 10,000 | 1 | 41.7 | 50 | 120% | 50A BQ2 |
| 004125-1 | 10,000 | 3 | 30.1 | 40 | 133% | 40A BQ3 |
| 004092-2 | 15,000 | 1 | 62.5 | 70 | 112% | 70A BQ2 |
| 004093-2 | 15,000 | 3 | 45.2 | 60 | 133% | 60A BQ3 |
| 004126-1 | 15,000 | 1 | 62.5 | 70 | 112% | 70A BQ2 |
| 004127-1 | 15,000 | 3 | 45.2 | 60 | 133% | 60A BQ3 |
| 004094-2 | 20,000 | 1 | 83.3 | 90 | 108% | 90A BQ2 |
| 004095-2 | 20,000 | 3 | 60.2 | 70 | 116% | 70A BQ3 |
| 004128-1 | 20,000 | 1 | 83.3 | 90 | 108% | 90A BQ2 |
| 004096-2 | 25,000 | 1 | 104.2 | 125 | 120% | 125A BQ2 |
| 004097-2 | 25,000 | 3 | 75.3 | 90 | 120% | 90A BQ3 |
| 004130-1 | 25,000 | 1 | 104.2 | 125 | 120% | 125A BQ2 |
| 004131-1 | 25,000 | 3 | 75.3 | 90 | 120% | 90A BQ3 |
| 004474-0 | 25,000 | 1 | 104.2 | 125 | 120% | 125A BQ2 |
| 004475-0 | 25,000 | 1 | 104.2 | 125 | 120% | 125A BQ2 |

* Amp Rating of C/B structured under model.



WARNING: Gaseous fuels such as natural and LP (propane) gas are highly explosive. Even the slightest spark can ignite such fuels and cause an explosion. No leakage of fuel is permitted. Natural gas, which is lighter than air, tends to collect in high areas. LP gas is heavier than air and tends to settle in low areas.

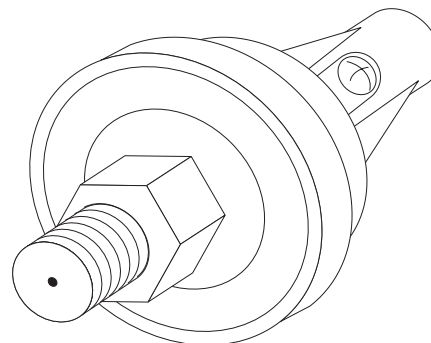
ENGINE PROTECTIVE DEVICES

The engine has several safety switches which cause the engine to automatically shut down under the following conditions: low oil pressure, high coolant temperature, engine overspeed, low coolant level or overcrank.

LOW OIL PRESSURE SWITCH:

This switch is normally-closed (N.C.) but is held open by engine oil pressure during engine running. Should operating oil pressure drop below about 8-10 psi (55-68 kPa), the switch contacts close and the engine shuts down automatically (Figure 4).

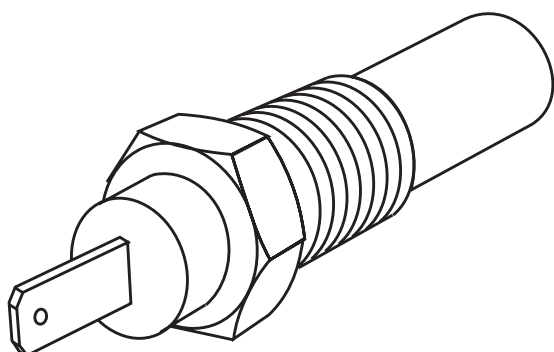
Figure 4 - Low Oil Pressure Switch



■ HIGH COOLANT TEMPERATURE SWITCH:

Normally open (N.O.) thermostatic switch has sensing tip which is immersed in captive coolant. Should coolant temperature exceed about 230°F (110°C), the switch contacts close, which causes the engine to shut down automatically (Figure 6).

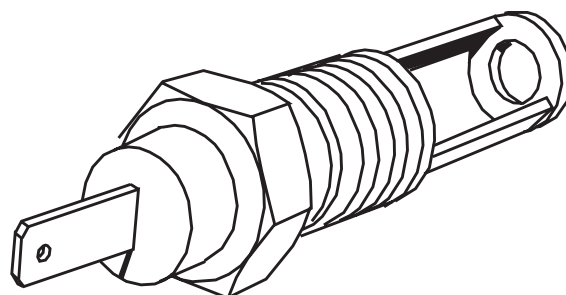
Figure 6- High Coolant Temperature Switch



■ LOW COOLANT LEVEL SWITCH:

Should engine coolant level drop below the level of the high coolant temperature switch, it is possible for the engine to overheat without automatic shutdown. To prevent such overheating without automatic shut down, the engine has a low coolant level sensor. If the engine coolant drops too low, the engine automatically shuts down (Figure 7).

Figure 7 - Low Coolant Level Sensor



■ OVERSPEED SHUTDOWN:

The CMA circuit board on liquid cooled units receives AC frequency (rpm) signals directly from the stator AC power windings, via sensing leads S15 and S16. Should AC frequency exceed about 72 Hz, circuit board action will automatically shutdown the engine (Figure 8).

***Rated power of generator is subject to and limited by such factors as ambient temperature, altitude, engine condition, and other factors. Engine power will decrease about 3.5% for each 1000 feet above sea level and will decrease an additional 1% for each 10°F above 60°F. Maximum output power of the generator is limited by maximum engine power.**

SPECIFICATIONS

■ GENERATOR SPECIFICATIONS

† Models 004474 & 004475 has same specifications as models 004096 & 004130 below.

| Model | 3-Phase | | | | 1-Phase | | | |
|--|----------------------------------|--------|------------------|------------------|--------------------|------------------|------------------|------------------|
| | 004097 004131 | 004095 | 004093 004127 | 004091 004125 | 004096† 004130† | 004094 004126 | 004092 004128 | 004090 004124 |
| *Rated Max. Cont. AC Power Output (kW) | 25 | 20 | 15 | 10 | 25 | 20 | 15 | 10 |
| Rated Voltage (volts) | 120/240 | | | | 120/240 | | | |
| Rated Max. Cont. Current @ 240 V, 1Ø | N/A | N/A | N/A | N/A | 104.2 | 83.3 | 62.5 | 41.7 |
| Current @ 240 V, 3Ø | 75.3 | 60.2 | 45.2 | 30.1 | N/A | N/A | N/A | N/A |
| No. of Rotor Poles | 2 | | 4 | | 2 | | 4 | |
| Driven Speed of Rotor | 3600 | 3600 | 1800 | 1800 | 3600 | 3600 | 1800 | 1800 |
| Rotor Excitation System | Direct excited brush type system | | | | | | | |
| Type of Stator | 12 wire reconnectable | | | | | | | |
| Rotor/Stator Insulation | Class F | | | | | | | |

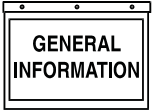
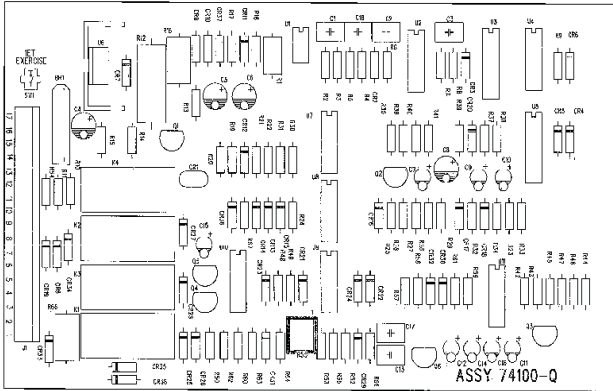


Figure 8 - Control Module Assembly Circuit Board



OVERCRANK SHUTDOWN:

After 90 seconds of crank-rest cycles, this function ends cranking if the engine fails to start in that 90-second span.

DC FUSE

This clearly labeled fuse is located on the front panel of the control system. It protects the panel wiring and components from damaging overload. Always remove this fuse before commencing work on the generator. The unit will not start or crank if the fuse is blown. Replace the fuse with one of the same size, type, and rating. Generac normally uses an AGC fuse rated at 30 amps.

UNPACKING

UNPACKING PRECAUTIONS:

Handle shipping cartons and crates with care. Use care to avoid damage from dropping, bumping, collision, etc. Store and unpack cartons with the proper side up, as noted on the shipping carton.

INSPECTION:

After unpacking, carefully inspect the generator for any damage that may have occurred during shipment. If loss or damage is noted at the time of delivery, have the person(s) making delivery note all damage on the freight bill or affix his signature under the consignor's memo of loss or damage.

LIFTING THE GENERATOR



WARNING: When lifting or hoisting equipment is used, be careful not to touch overhead power lines. The generators weight of more than 900 pounds requires proper tools, equipment, and qualified personnel to be used in all phases of handling and unpacking.

SPECIFICATIONS

ENGINE SPECIFICATIONS

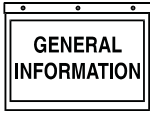
| | |
|--------------------------------|--|
| Make | Mitsubishi |
| Displacement | 92 inches ³ (1.5 liters) |
| Cylinder Arrangement..... | 4, in-line |
| Valve Arrangement..... | Overhead Cam |
| Firing Order..... | 1-3-4-2 |
| Number of Main Bearings | 5 |
| Compression Ratio | 9 to 1 |
| No. of Teeth on Flywheel | 104 |
| Ignition Timing | |
| at 1800 rpm | 35 degrees BTDC |
| at 3600 rpm | 43 degrees BTDC |
| Spark Plug Gap | 0.020-0.025 inch |
| Recommended Spark Plugs | |
| Champion | RN11YC4 |
| Oil Pressure..... | 30-50 psi |
| Crankcase Oil Capacity..... | 4.0 U.S. quarts (3.8 liters) |
| Recommended Engine Oil..... | SAE 15W-40 |
| Type of Cooling System | Pressurized, closed recovery |
| Cooling Fan | Pusher Type |
| Cooling System Capacity | 2 U.S. gallons (7.6 liters) |
| Recommended Coolant..... | Use a 50-50 mixture of ethylene glycol base. |

FUEL CONSUMPTION

| | |
|---|-----------------------------------|
| Models 004096, 004097, 004130, 004131, 004474, 004475 | |
| Using Natural Gas | 441 cu. ft. per hour |
| Using LP Gas | 175 cubic ft.(4.8 gal.) per hour |
| Models 004094, 004095, 004128 | |
| Using Natural Gas | 359 cu. ft. per hour |
| Using LP Gas | 143 cubic ft. (4.0 gal.) per hour |
| Model 004092, 004093, 004126, 004127 | |
| Using Natural Gas | 277 cu. ft. per hour |
| Using LP Gas | 110 cubic ft.(3.1 gal.) per hour |
| Models 004090, 004091, 004124, 004125 | |
| Using Natural Gas | 195 cu. ft. per hour |
| Using LP Gas | 77 cubic ft. (2.2 gal.) per hour |

NOTE:

Fuel consumption is given at rated maximum continuous power output when using natural gas rated at 1000 Btu per cubic foot; or LP gas rated 2520 Btu per cubic foot. Actual fuel consumption obtained may vary depending on such variables as applied load, ambient temperature, engine conditions and other environmental factors.



Section 1 – General Information

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

TORQUE SPECIFICATIONS

Cylinder Head15 (+ 90° + 90°) ft.lb.
 Intake Manifold13 ft.lb.
 Exhaust Manifold13 ft.lb.

ENGINE OIL RECOMMENDATIONS

The unit has been filled with 15W-40 engine oil at the factory. Use a high-quality detergent oil classified “For Service CC, SD, SE, SF.” Detergent oils keep the engine cleaner and reduce carbon deposits. Use oil having the following SAE viscosity rating, based on the ambient temperature range anticipated before the next oil change:

| Temperature | Oil Grade (Recommended) |
|-----------------------------|-------------------------|
| Above 80° F (27° C) | SAE 30W or 15W-40 |
| 32° to 80° F (-1° to 27° C) | SAE 20W-20 or 15W-40 |
| Below 32° F (0° C) | SAE 10W or 15W-40 |



CAUTION: Any attempt to crank or start the engine before it has been properly serviced with the recommended oil may result in an engine failure.

COOLANT RECOMMENDATIONS

Use a mixture of half low silicate, ethylene glycol base anti-freeze and half soft water. Cooling system capacity is about 8 U.S. quarts (8.5 liters). Use only soft water and only low silicate anti-freeze. If desired, add a high quality rust inhibitor to the recommended coolant mixture. When adding coolant, always add the recommended 50-50 mixture.



CAUTION

Do not use any chromate base rust inhibitor with ethylene glycol base anti-freeze or chromiumhydroxide (“green slime”) forms and will cause overheating. Engines that have been operated with a chromate base rust inhibitor must be chemically cleaned before adding ethylene glycol base anti-freeze. Using any high silicate anti-freeze boosters or additives will also cause overheating. We also recommend that you **DO NOT** use any soluble oil inhibitor for this equipment.

BEFORE INSTALLATION

Before installing this equipment, check the ratings of both the generator and the transfer switch. Read “Emergency Isolation Method” and “Total Circuit Isolation Method” in the installation manual (Part No. 079699).

The generator’s rated wattage/amperage capacity must be adequate to handle all electrical loads that the unit will power. You may have to group the critical (essential) loads together and wire them into a separate “emergency” distribution panel.

This generator can be installed in conjunction with a standard Generac “GTS” type transfer switch, if desired.

The standard transfer switch has no sensing or controlling circuit boards. Instead, the generator control console houses a “Control Module Assembly”, which controls all phases of operation, including engine start up and load transfer.



STANDBY GENERATOR INSTALLATION

⚠ DANGER ⚠



Connecting this generator to an electrical system normally supplied by an electric utility shall be by means of a transfer switch (such as the Generac “GTS” type transfer switch), so as to isolate the electric system from the utility distribution system when the generator is operating. Failure to isolate the electric system by these means will result in damage to the generator and may also result in injury or death to utility workers due to backfeed of electrical energy.



⚠ CAUTION ⚠



If an open bottom is used, the engine-generator is to be installed over non-combustible materials and should be located such that combustible materials are not capable of accumulating under the generator set.

Only qualified, competent installation contractors or electricians thoroughly familiar with applicable codes, standards and regulations should install this standby electric power system. The installation must comply strictly with all codes, standards and regulations pertaining to the installation.

⚠ CAUTION ⚠

After the system has been installed, you must not do anything that might render the installation in non-compliance with such codes, standards and regulations.

NOTE:

For more information about the installation of a standby system, you can order *Engine-Generator Standby Electric Power Systems Installer's Guide and Reference Manual* (part #046622) from your Generac Authorized Service Dealer.

◆ NFPA STANDARDS

The following published standards booklets pertaining to standby electric systems are available from the National Fire Protection Association (NFPA), Batterymarch Park, Quincy, MA 02269:

- NFPA No. 37, STATIONARY COMBUSTION ENGINES AND GAS TURBINES.
- NFPA No. 76A, ESSENTIAL ELECTRICAL SYSTEMS FOR HEALTH CARE FACILITIES.
- NFPA No. 220, STANDARD TYPES OF BUILDING CONSTRUCTION
- NFPA No. 68, GUIDE FOR EXPLOSION VENTING
- NFPA No. 70, NATIONAL ELECTRICAL CODE.
- NFPA No. 30, FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE.
- NFPA No. 10, INSTALLATION, MAINTENANCE AND USE OF PORTABLE FIRE EXTINGUISHERS.

◆ OTHER PUBLISHED STANDARDS

In addition to NFPA standards, the following information pertaining to the installation and use of standby electric systems is available:

- Article X, NATIONAL BUILDING CODE, available from the American Insurance Association, 85 John Street, New York, N.Y. 10038.
- AGRICULTURAL WIRING HANDBOOK, obtainable from the Food and Energy Council, 909 University Avenue, Columbia, MO, 65201.
- ASAE EP-364.2, INSTALLATION AND MAINTENANCE OF FARM STANDBY ELECTRIC POWER, available from the American Society of Agricultural Engineers, 2950 Niles Road, St. Joseph, MI 49085.
- A52.1, AMERICAN NATIONAL STANDARD FOR CHIMNEYS, FIREPLACES AND VENTING SYSTEMS, available from the American National Standard Institute, 1430 Broadway, New York, N.Y. 10018.

BASIC STANDBY ELECTRIC SYSTEM

Figure 2.1 shows a schematic diagram of a basic standby electric system. Both the UTILITY power supply and the STANDBY (generator) output are connected to an approved transfer switch. The transfer switch is required by electrical code and serves the following functions:

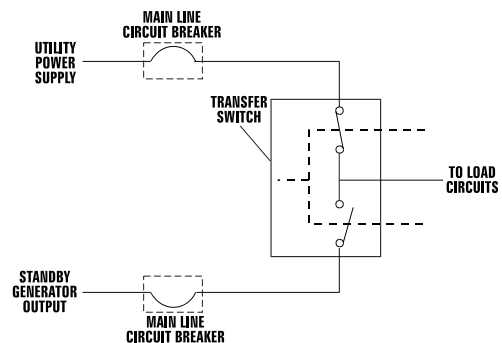
- Permits the LOAD circuits to be connected to only one power supply at a time.
- Prevents electrical backfeed between the generator and the UTILITY power circuits.

Notice that both the STANDBY and the UTILITY power supplies to the transfer switch are protected against overload by a main line circuit breaker.

NOTE:

Generac recommends the use of a Generac power systems “GTS” type transfer switch in conjunction with this generator.

Figure 2.1 – Basic Standby Electric System





EMERGENCY CIRCUIT ISOLATION METHOD

This prevents overloading the generator by keeping electrical loads below the wattage/amperage capacity of the generator. If the generator is powering only critical loads, within the wattage/amperage capacity, during utility power outages, you might consider using the emergency circuit isolation method.

Critical electrical loads are grouped together and wired into a separate “Emergency Distribution Panel.” Load circuits powered by that panel are within the wattage/amperage capacity of the generator set. When this method is used, it is difficult to overload the generator. The transfer switch must meet the following requirements:

- It must have an ampere rating equal to the total amperage rating of the emergency distribution panel circuit.
- Have it installed between the building’s main distribution panel and the emergency distribution panel.

TOTAL CIRCUIT ISOLATION METHOD

When a generator capable of powering all electrical loads in the circuit is to be installed, you may use the “Total Circuit Isolation Method.” It is possible for the generator to be overloaded when this isolation method is employed. The following apply to the transfer switch in this type of system.

- Ampere rating of the transfer switch must equal the ampere rating of the normal incoming utility service.
- The transfer switch is installed between the utility service entrance and the building distribution panel.

GROUNDING THE GENERATOR

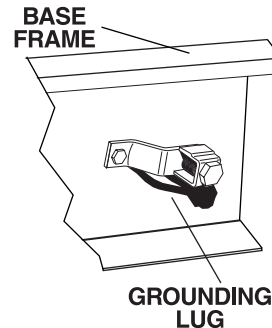
The National Electrical Code requires the frame and external electrically conductive parts of this equipment to be properly connected to an approved earth ground and/or grounding rods. For that purpose, a GROUND LUG (Figure 2.2) is provided on the generator mounting base. Consult a qualified electrician for grounding requirements in your area. Grounding procedures must meet local regulations.



Do not connect the ground wire to any pipe that carries a flammable or explosive substance – FIRE or an EXPLOSION may result.

Proper grounding helps protect personnel against electrical shock in the event of a ground fault condition in the generator or in connected electrical devices. In addition, grounding helps dissipate static electricity that often builds up in ungrounded devices.

Figure 2.2 – Generator Grounding Lug (typical)



GENERATOR AC NEUTRAL CONNECTIONS

Generac uses an UNGROUNDED AC neutral. Grounding is recommended only at the main service entrance. If the neutral wire is grounded and one of the phase loads becomes grounded, the excessive current opens the load circuit breaker or collapses the generator field. The actual result depends on the electrical characteristics of the particular installed generator.

TRANSFER SWITCH START SIGNAL CONNECTIONS

If your generator is to be installed with an automatic transfer switch, such as a Generac GTS-type switch, it will be necessary to connect the two-wire start control system.

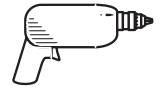
Connect the two-wire start signal from the automatic transfer switch to the automatic start connection, which is located in the right hand corner inside the control panel. Match wires 178 and 183 in the transfer switch to 178 and 183 on the terminal strip in the control panel. The conductors for the two-wire start circuit must be in their own conduit.

BATTERY INSTALLATION



Standby generators installed with automatic transfer switches will crank and start automatically when normal (utility) source voltage is removed or is below an acceptable preset level. To prevent such automatic start-up and possible injury to personnel, do not connect battery cables until you are certain that normal source voltage at the transfer switch is correct and you are ready to place the system into operation.

Storage batteries give off explosive hydrogen gas. This gas can form an explosive mixture around the battery for several hours after charging. The slightest spark can ignite the gas and cause



an explosion. Such an explosion can shatter the battery and cause blindness or other injury. Any area that houses a storage battery must be properly ventilated. Do not allow smoking, open flame, sparks or any spark producing tools or equipment near the battery.

- ▲ **Battery electrolyte fluid is an extremely caustic sulfuric acid solution that can cause severe burns. Do not permit fluid to contact eyes, skin, clothing, painted surfaces, etc. Wear protective goggles, protective clothing and gloves when handling a battery. If you spill the fluid, flush the affected area immediately with clear water.**

—▲ **WARNING** ▲—

- ▲ **Do not dispose of the battery in a fire. The battery is capable of exploding.**
- ▲ **Do not open or mutilate the battery. Released electrolyte can be toxic and harmful to the skin and eyes.**
- ▲ **The battery represents a risk of high short circuit current. When working on the battery, always remove watches, rings or other metal objects, and only use tools that have insulated handles.**

◆ VENTED BATTERIES

—▲ **CAUTION** ▲—

- ▲ **The electrolyte is a dilute sulfuric acid that is harmful to the skin and eyes. It is electrically conductive and corrosive. The following procedures are to be observed:**
 - Wear full eye protection and protective clothing,
 - Where electrolyte contacts the skin, wash it off immediately with water,
 - Where electrolyte contacts the eyes, flush thoroughly and immediately with water and seek medical attention, and
 - Spilled electrolyte is to be washed down with an acid-neutralizing agent. A common practice is to use a solution of one pound (500 grams) bicarbonate of soda to one gallon (4 liters) of water. The bicarbonate of soda solution is to be added until the evidence of reaction (foaming) has ceased. The resulting liquid is to be flushed with water and the area dried.
- ▲ **Lead acid batteries present a risk of fire because they generate hydrogen gas. The following procedure are to be followed:**
 - **DO NOT SMOKE** when near batteries,
 - **DO NOT** cause flame or spark in battery area, and
 - **Discharge static electricity from body before touching batteries by first touching a grounded metal surface.**

Servicing of batteries is to be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

For recommended batteries, see “Specifications.” All batteries must be at 100 percent state-of-charge before they are installed on the generator.

When using maintenance-free batteries, it is not necessary to check the specific gravity or electrolyte level. Have these procedures performed at the intervals specified in Section 4, “Maintenance.” A negative ground system is used. Battery connections are shown on the wiring diagrams. Make sure all batteries are correctly connected and terminals are tight. Observe battery polarity when connecting batteries to the generator set.

Note:

Damage will result if the battery connections are made in reverse.

PREPARATION BEFORE START-UP

The instructions in this section assume that the standby generator has been properly installed, serviced, tested, adjusted and otherwise prepared for use by a competent, qualified installation contractor. Be sure to read the “Safety Rules” on Pages 2 and 3, as well as all other safety information in this manual, before attempting to operate this (and related) equipment.

■ PRIOR TO INITIAL START-UP

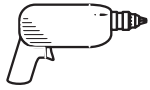
—▲ **CAUTION** ▲—

- ▲ **Prior to initially starting the generator, it must be properly prepared for use. Any attempt to crank or start the engine before it has been properly serviced with the recommended types and quantities of engine fluids (oil, coolant, fuel, etc.) may result in an engine failure.**

Before starting the generator for the first time, the installer must complete the following procedures. For follow-up maintenance information and/or service intervals, please refer to Section 4, “Maintenance.”

► Transfer Switch

If this generator is used to supply power to any electrical system normally powered by an electric utility, the National Electrical Code requires that a transfer switch be installed. The transfer switch prevents electrical backfeed between two different electrical systems. (For additional information, see the applicable transfer switch manual for this unit.) The transfer switch, as well as the generator and other standby components, must be properly located and mounted in strict compliance with applicable codes, standards and regulations.



► **Fuel System**

Make sure the fuel supply system to the generator (a) delivers the correct fuel at the correct pressure and (b) is properly purged and leak tested according to code. No fuel leakage is permitted. See “Specifications” (Page 7) for more information.

► **Generator Set Lubrication**

Check the engine crankcase oil level before operating and add oil to the proper level – the dipstick “FULL” mark. Never operate the engine with the oil level below the dipstick “ADD” mark. See “Specifications” (Page 7) and “Engine Oil Recommendations” (Page 8).

NOTE:

This engine is shipped from the manufacturer with 15W-40 oil. This oil should be changed after 30 hours of operation.

► **Engine Coolant**

Have the engine cooling system properly filled with the recommended coolant mixture. Check the system for leaks and other problems. See “Specifications” (Page 7) and “Coolant” (Page 8).

► **Belt Tension**

Check the engine fan belt tension and condition prior to placing the unit into service and at recommended intervals. Belt tension is correct when a force of approximately 22 pounds (10 kg), applied midway between pulleys, deflects the belt about 3/8- to 5/8-inch (10 to 16 mm).

► **Electrical System**

Make sure the generator is properly connected to an approved earth ground and/or ground rod.

Make sure the generator battery is fully charged, properly installed and interconnected, and ready for use.

Check to ensure that there are no loose electrical connections. Restrain any loose wires to keep them clear of any moving generator set components.

USING A STANDARD “GTS” TRANSFER SWITCH

When required, the pre-packaged standby generator can be installed with a standard Generac “GTS” type automatic transfer switch.

When you use a standard GTS type transfer switch, it controls automatic operation and automatic transfer as follows:

- Solid state circuits in the transfer switch monitor utility power source voltage.

- When utility source voltage drops below a pre-set level, transfer switch action closes the circuit. The engine then cranks and starts as controlled by the pre-packaged generator’s Control Module circuit board.
- After the engine starts and when the generator AC output voltage and frequency have reached a pre-set value, transfer switch circuits signal the transfer switch main contacts to actuate to the “Standby” power source side. Generator AC output then powers load circuits.
- When the utility power source voltage is restored above a pre-set level, transfer switch solid state circuits signal the switch main contacts to move back to their utility power source side.
- Following re-transfer back to the utility power source side, transfer switch circuit board action opens the circuit. Engine then shuts down.

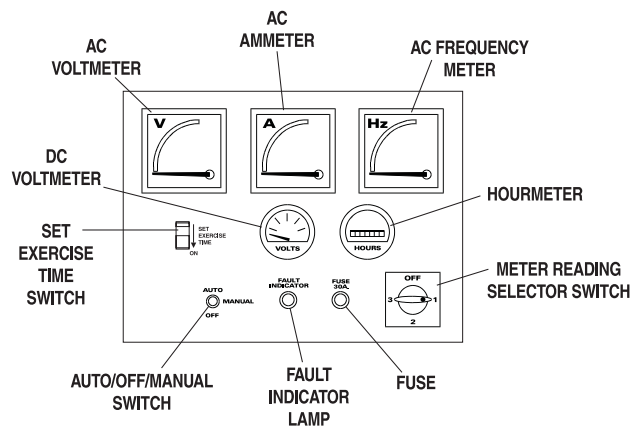
NOTE:

If your generator is installed in conjunction with a standard GTS type transfer switch, refer to the applicable transfer switch manual for exact operating parameters and timing sequences.

CONTROL CONSOLE COMPONENTS

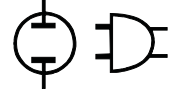
The components of a water-cooled generator control console (Figure 8) are as follows:

Figure 8 - Water-Cooled Generator Panel



■ **AC VOLTMETER:**

The voltmeter displays generator AC output voltage during operation. Voltage is regulated by a solid state voltage regulator and is proportional to AC frequency. Refer to your unit’s DATA PLATE for rated AC voltage.



■ AC AMMETER:

Indicated current draw of connected electrical loads during operation. DO NOT EXCEED YOUR UNIT'S RATED MAXIMUM CONTINUOUS CURRENT. Refer to the unit DATA PLATE.

■ AC FREQUENCY METER:

Indicates generator AC output frequency in "Hertz" (cycles per second). Frequency is proportional to engine speed. Units with a 4-pole rotor supplies 60 Hertz at 1800 rpm. Units with a 2-pole rotor supplies 60 Hz at 3600 rpm. Frequency reading with no electrical loads connected (no-load condition) should be between 59-61 Hertz.

■ DC VOLTMETER:

The generator is equipped with a belt-driven DC alternator, which maintains battery state of charge when the engine operates. The Control Module Assembly also incorporates a trickle charge circuit which maintains battery state of charge during non-operating periods. Battery voltage should read about 12.5 to 14.5 volts DC. A low battery voltage indicates the battery is discharging.

■ HOURMETER:

Indicates time the engine-generator has operated, in hours and tenths of hours. Use the hourmeter along with the periodic maintenance schedule for your generator set.

■ AUTO/OFF/MANUAL SWITCH:

Use this 3-position switch as follows:

- Set the switch to "Auto" for fully automatic operation. See "Automatic Operation".
- Set switch to "Manual" position to crank and start the generator engine.
- Set switch to "Off" position to shut down an operating engine. With "Off" selected, operation will not be possible.



DANGER! With switch set to "auto", engine can crank and start suddenly without warning. Such automatic start up normally occurs when utility source voltage drops below a pre-set level. To prevent possible injury that might be caused by such sudden starts, set AUTO/OFF/MANUAL switch to "off" before working on or around the unit. Then, place a "do not operate" tag on control console.

■ FAULT INDICATOR LAMP:

Lamp goes ON when one or more of the following engine faults occurs and when engine shuts down.

- Low oil pressure
- High coolant temperature
- Low coolant level
- Overcrank
- Overspeed

■ 30 AMP FUSE:

Fuse protects the control console's DC control circuit against electrical overload. If the fuse has melted open because of an overload, engine cranking and startup cannot occur. Should you need to replace the fuse, use only an identical 30-amp replacement fuse. (Type AGC)

■ 7.5 AMP INLINE FUSE:

A 7.5 Amp inline fuse has been added to the wire harness of all units starting in the second half of 2001. This inline fuse is connected in the 15A line that runs between the Auto/Off/Manual switch and position 10 of the 76009A PCB. This fuse protects the start, fuel, field boost, and transfer outputs from the PCB and will open if there is excessive current draw on any one of these outputs.

NOTE:

This fuse will not remove the + battery input power from the PCB when it opens. This means the exercise timer will not be reset. If this fuse does open, carefully check the wiring to the start, fuel, field boost and transfer outputs before replacing the fuse.

■ METER READING SELECTOR SWITCH:

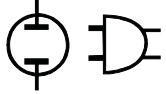
Switch permits you to select either line-to-line or line-to-neutral voltage and amperage readings on the console AC voltmeter and AC ammeter.

■ SET EXERCISE TIME SWITCH:

Switch allows you to program the generator to start and exercise automatically. "See Weekly Exercise Cycle."

MANUAL TRANSFER AND START UP

To transfer electrical loads to the "Standby" (generator) power source side and start the engine manually, refer to the Owner's Manual of your particular transfer switch.



RETRANSFER AND SHUTDOWN

When utility power source voltage has been restored, electrical loads may be transferred back to that source and the generator can be shut down as follows:

- Verify that utility power supply voltage to the transfer switch has been positively turned “Off,” using whatever means provided (such as utility main line circuit breaker).
- Set the generator’s main circuit breaker to its “Off” or “Open” position.
- Let the generator engine run at no-load for a few minutes, to stabilize internal unit temperatures.
- On the generator console, set the Auto-Off-Manual switch to “Off”. Wait for engine to come to a complete stop.
- For transfer to utility position, refer to the Owner’s Manual of your particular transfer switch.
- Turn on the utility power supply to the transfer switch, using whatever means provided (such as a utility main line circuit breaker). The utility power source now powers the loads.

AUTOMATIC OPERATION

To set the system for fully automatic operation, proceed as follows:

- Check that load circuits are connected to the utility power supply.
- Set the Auto/Off/Manual switch to its “Auto” position.
- Set the generator main circuit breaker to its “On” or “Closed” position.

WEEKLY EXERCISE CYCLE

The generator will start and exercise once every 7 days. During this weekly exercise, the unit runs for about 20 minutes and shuts down. Transfer of loads to generator output does not occur during the exercise.

To select day and time for exercising, proceed as follows:

- Set the Auto/Off/Manual switch to OFF.
- Set generator main circuit breaker to OFF or OPEN.
- Locate the rocker switch on the control panel identified with the words “Set Exercise Time” (Figure 9).
- Push “Set Exercise Time” switch to ON position for 20 to 30 seconds and then release. Switch will spring back into its original position when released.
- Wait 30 seconds before setting the Auto/Off/Manual switch to “AUTO” position.



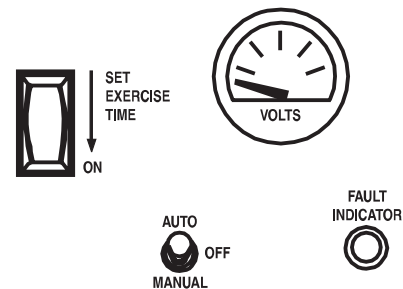
CAUTION: If you switch the Auto/Off/Manual switch too soon, the engine may start. If engine does start, it will shut down automatically in about two (2) minutes.

- Set the generator main circuit breaker to its ON or CLOSED position.
- Generator is now programmed to start and exercise every 7 days thereafter, on day and time of day the switch was actuated.
- Place a sign on the generator control panel and the transfer switch, indicating the day and time the generator will be exercising.

NOTE:

If battery terminals are disconnected or control panel fuse is removed, the exercise timer needs to be reset for correct automatic exercise operation.

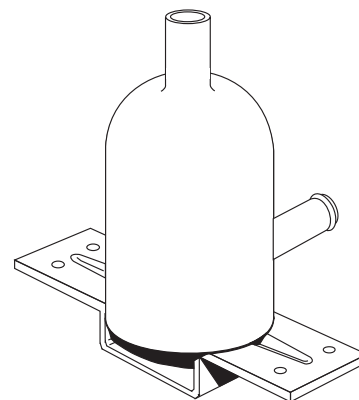
Figure 9 - “Set Exercise” Switch



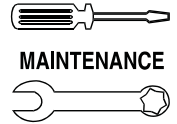
ENGINE HEATER

Your Generac standby generator comes equipped with a block heater (Figure 10), similar to the block heaters used in automotive applications.

Figure 10 - Engine Block Heater



Refer to applicable wiring diagram(s) and electrical schematic(s) at back of manual for wiring connections. Customer supplies a 120V 15A Utility fed circuit for the block heater.



MAINTENANCE

MAINTENANCE PERFORMED BY AUTHORIZED SERVICE FACILITIES

A. EVERY THREE MONTHS

1. Check battery state of charge and condition.
2. Inspect and test fuel system.
3. Check transfer switch.
4. Inspect exhaust system.
5. Check engine ignition system.
6. Check fan belts.

B. ONCE EVERY SIX MONTHS

1. Test Engine Safety Devices (low oil pressure, low coolant level, high coolant temperature).

C. ONCE ANNUALLY

1. Test engine governor; adjust or repair, if needed.
2. Clean, inspect generator.
3. Flush cooling system.

D. FIRST 100 OPERATING HOURS

1. Change engine oil and oil filter. (After initial change, service engine oil and filter at 150 operating hours or 6 months, whichever comes first.)
2. Retorque cylinder head. (See Torque Specs, page 7.)
3. Retorque intake and exhaust manifold. (See Torque Specs, page 7.)

E. EVERY 500 OPERATING HOURS

1. Service air cleaner.
2. Check starter.
3. Check engine DC alternator.

F. EVERY 800 OPERATING HOURS

1. Retorque cylinder head. (See Torque Specs, page 7.)
2. Retorque intake and exhaust manifold. (See Torque Specs, page 7.)
3. Check engine compression.
4. Check valve clearance.

OVERLOAD PROTECTION FOR ENGINE DC ELECTRICAL SYSTEM

Engine cranking, start up and running are controlled by a solid state Engine Controller circuit board. Battery voltage is delivered to that circuit board via a 30 amp fuse. These overcurrent protection devices will open if the circuit is overloaded.



CAUTION! If a circuit breaker opens or a fuse element melts, you should find the cause of the overload before resetting the circuit breaker or replacing the fuse.

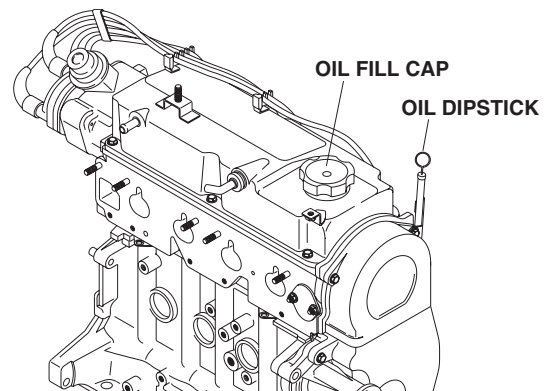
CHECKING FLUID LEVELS

■ CHECK ENGINE OIL

Check engine crankcase oil level (Figure 11) at least every 20 hours of operation, or prior to use.

- Remove oil dipstick and wipe dry with a clean, lint-free cloth.
- Install oil dipstick, then remove again.
- Oil should be between FULL and ADD marks.
- If oil level is below the dipstick ADD mark, remove oil fill cap. Add the recommended oil to bring oil level up to the FULL mark. **DO NOT FILL ABOVE THE "FULL" MARK.** See page 6 for recommended oils.

Figure 11 - Oil Dipstick and Oil Fill Cap



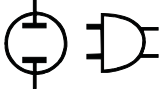
■ BATTERY FLUID

Check battery electrolyte fluid at least once weekly. Fluid should cover separators in all battery cells. If fluid level is low, add distilled water to cover tops of separators. **DO NOT USE TAP WATER IN BATTERY.**

■ ENGINE COOLANT

Check coolant level in coolant recovery bottle. See Specifications, page 8

- Add recommended coolant mixture as necessary.
- Periodically remove radiator pressure cap to make sure the coolant recovery system is functioning properly. Coolant should be at bottom of radiator filler neck. If coolant level is low, inspect gasket in radiator pressure cap. Replace cap, if necessary. To have pressure cap tested, contact an authorized Generac Service Facility. Inspect cooling system and coolant recovery system for leaks.



MAINTENANCE OWNER/OPERATOR CAN PERFORM

■ CHECK ENGINE OIL LEVEL

Refer to “Checking Fluid Levels” on page 15.

■ CHECK BATTERY

- Check battery fluid level each week as outlined under “Check Fluid Levels”.
- Check battery cables for condition, tightness, corrosion or damage. Clean, tighten or replace as necessary.

■ EXERCISE SYSTEM

Start the generator engine at least once every seven days and let it run at least 20 minutes. See page 14, “Weekly Exercise Cycle”.

■ INSPECT COOLING SYSTEM

- Inspect engine cooling system at least once each month.
- Check hoses for damage, deterioration, leaks, etc. Correct any discrepancies found.
- Check hose clamps for tightness.

■ CHECK ENGINE COOLANT LEVEL

See “Checking Fluid Levels” on page 15.

■ PERFORM VISUAL INSPECTION

Complete a thorough visual inspection of the entire engine-generator monthly. Look for obvious damage, loose, missing or corroded nuts, bolts and other fasteners. Look for fuel, oil or coolant leaks.

■ INSPECT EXHAUST SYSTEM

Inspect the exhaust system at least once every three months. Check all exhaust system pipes, mufflers, clamps, etc. for condition, tightness, leaks, security, damage.

■ CHECK FAN BELT

- Inspect fan belts every three months. Replace any damaged, deteriorated, worn or otherwise defective belt.
- Check fan belt tension. Thumb pressure, exerted midway between pulleys, should deflect about 3/8 to 3/4 inch. Adjust belt tension as required.

■ INSPECT ENGINE GOVERNOR

Visually inspect electronic governor.



DANGER: Do not attempt to adjust the governor. Only qualified service facilities should adjust the governor. Excessively high operating speeds are dangerous and increase the risk of personal injury. Low speeds impose a heavy load on the engine when adequate engine power is not available and may shorten engine life. Correct rated frequency and voltage are supplied only at the proper governed speed. Some connected electrical load devices may be damaged by incorrect frequency and/or voltage. Only qualified service technicians should adjust the governed speed.

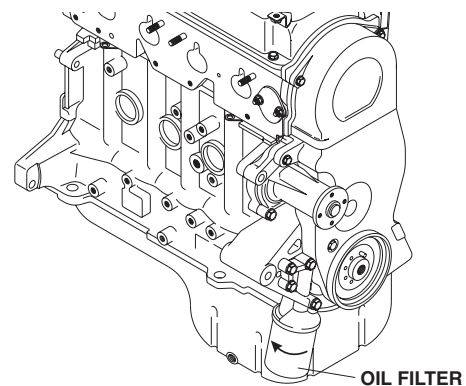
■ CHANGING ENGINE OIL

Refer to maintenance performed by authorized service facilities for engine oil and filter change frequencies.

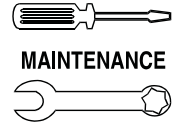
Drain the oil while the engine is still warm from running. This means warm up the engine, shut it down and drain immediately as follows:

1. Remove OIL DRAIN HOSE from its retaining clip.
2. Loosen and remove OIL DRAIN HOSE CAP. Drain oil completely into suitable container.
3. When all oil has drained, install and tighten OIL DRAIN HOSE CAP, and re-install into its retaining clip.
4. Turn OIL FILTER (Figure 12) counterclockwise and remove. Dispose of old filter.

Figure 12 - Oil Filter



5. Apply light coating of new engine oil to seal of new oil filter. Install FILTER and tighten by hand only. DO NOT OVERTIGHTEN.



6. Remove OIL FILL CAP (Figure 11, page 15). Add recommended oil (see SPECIFICATIONS). DO NOT FILL ABOVE THE DIPSTICK “FULL” MARK. Crankcase oil capacity is 4.0 U.S. quarts (3.8 liters)



CAUTION: After refilling the crankcase with oil, always check oil level on dipstick. NEVER OPERATE ENGINE WITH OIL BELOW THE DIPSTICK “ADD” MARK.

7. Start engine and check for oil leaks.

- DO NOT use jumper cables and a booster battery to crank or start the generator engine.
- DO NOT recharge a weak battery while it is installed in the generator. Remove battery from generator and recharge in a well-ventilated area, away from fuel vapors, sparks, heat or flames.
- Battery electrolyte fluid is an extremely caustic sulfuric solution that can cause severe burns. DO NOT permit fluid to contact eyes, skin, clothing, painted surfaces, wiring insulation, etc. If you spill any battery fluid, flush the affected area with clear water immediately.
- Always wear safety glasses, rubber apron and gloves when handling a battery.
- Batteries give off explosive hydrogen gas while charging. The gas can form an explosive mixture around the battery for several hours after charging. Any spark, heat or flames can ignite the gas and cause an explosion which can shatter the battery, causing blindness or other serious injury.

■ COOLANT CHANGE

Every year, have Authorized Service Facility drain, flush and refill the cooling system. See SPECIFICATIONS (page 8) for cooling system recommendations.

MISCELLANEOUS MAINTENANCE

■ CLEANING THE GENERATOR

Keep your generator as clean and as dry as possible. Dirt and moisture that accumulates on internal generator windings have an adverse effect on insulation resistance.

Periodically clean generator exterior surfaces. A soft brush may be used to loosen caked on dirt. You can use a vacuum system or dry, low pressure air to remove any accumulations of dirt. The generator is housed inside an all-weather enclosure, clean the enclosure with a soft, damp cloth or sponge and water.

Once each year have the generator cleaned and inspected by an Authorized Service Facility. That facility will use dry, low pressure air to clean internal windings. Parts inside the control console should be cleaned and inspected at this time as well.

Finally, have the insulation resistance of stator and rotor windings checked. If insulation resistances are excessively low, the generator may require drying.

■ BATTERY

All lead-acid storage batteries discharge when not in use. Refer to specific instructions and warnings that accompany your battery. If such information is not available, observe the following precautions when handling a battery:

■ BATTERY REPLACEMENT

Generac uses these different types of vented batteries on units ranging up to 400 kW. When replacing batteries, use the same number and the type of battery that follows:

| Generac P/N | BCI Group No. | CCA |
|-------------|---------------|----------------|
| 058665 | 27F | 700 @ 0 deg. F |

Note:

The BCI number should be located directly on the battery.



Section 5 – Troubleshooting

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

| PERIODIC REPLACEMENT PARTS | |
|----------------------------|-----------------------|
| Part Name | Generac's Part Number |
| Oil Filter | # 0A45310244 |
| Radiator Cap | # 046627 |
| Air Cleaner | # 059402 |
| Spark Plug | # 0A45310275 |

TROUBLESHOOTING POINTS

PROBLEM

Engine won't crank.

CAUSE

1. 30 amp fuse blown.
2. Loose or corroded or defective
3. Defective starter contactor.
4. Defective starter motor.
5. Dead or Defective Battery.

CORRECTION

1. Replace fuse.
2. Tighten, clean or replace battery cables as necessary.
3. Replace contactor.
4. Replace starter motor.
5. Remove, change or replace battery.

Engine cranks but won't start

1. Out of fuel.
2. Fuel solenoid (FS) is defective
3. Open Wire #14 from Engine Control circuit board
4. Spark plugs defective.

1. Replenish fuel.
2. Replace solenoid.
3. Reconnect wire.
4. Clean, regap or replace plugs.

Engine starts hard, runs rough.

1. Flame arrestor (air cleaner) plugged or damaged.
2. Plugged fuel line.
3. Defective spark plugs.

1. Clean or replace as needed.
2. Unclog fuel line.
3. Clean, regap or replace plugs.

Engine starts then shuts down.

1. Engine oil level is low.
2. Engine is overheated.
3. Defective Low Oil Pressure Switch
4. Defective Coolant Temperature Switch
5. Defective Control Module circuit board.
6. Coolant Level is Low.
7. Defective Low Coolant Level Switch

1. Check oil and add oil as needed.
2. Check cooling system for leaks.
3. Replace switch.
4. Replace switch.
5. Replace board.
6. Repair leak - Add coolant.
7. Replace Switch.

Auto/Off/Manual Switch at OFF, engine continues to run

1. Defective Auto/Off/Manual switch
2. Open/disconnected wire #15A between Auto/Off/Manual switch and Control Module circuit board.
3. Defective Control Module circuit board

1. Replace switch.
2. Reconnect/close wire.
3. Replace board.

No AC output from generator.

1. Check main line circuit breaker.
2. Check circuit breaker & fuses.
3. Transfer switch set to NORMAL position
4. Generator internal failure.
5. Thermal circuit breaker open.

1. Reset to ON or CLOSED.
2. Reset and replace, if necessary.
3. Set to GENERATOR position.
4. Contact an Authorized Generac facility.
5. Auto-reset - Wait 5 min. and attempt restart.



Following is a recommended maintenance schedule for Generac small standby and residential generator sets from 8 kW to 35 kW in size, and applies to both diesel engine and gas engine driven units. The established intervals in the schedule are the *maximum* recommended when the unit is used in an average service application. They will need to be decreased (performed more frequently) if the unit is used in a severe application. Use the unit hour meter or calendar time, whichever occurs first, from the previous maintenance interval to determine the next required maintenance interval.

Service Maintenance Interval Information:

The various service maintenance intervals are designated by interval numbers as follows:

- 1** An early inspection of the generator set to insure it is ready to operate when required and to identify any potential problem areas.

*Performed monthly or following each 10 hours of operation of the unit and requires approximately **.5 man-hours** per unit to complete.*

This inspection may be performed by the end user providing the following safety steps are taken to prevent the engine from starting automatically without warning:

To prevent injury, perform the following steps in the order indicated before starting any maintenance:

- **Disable the generator set from starting and/or connecting to the load by setting the control panel Auto-Off-Manual switch to the “OFF” position.**
- **Remove the control panel fuse.**
- **Turn off the battery charger.**
- **Remove the negative battery cable.**

The battery charger must be turned off BEFORE removing the battery cable to prevent an over current condition from burning out sensitive control panel components and circuits.

Following all maintenance, reverse these steps to insure the unit is returned to standby setup for normal operation when required.

- 2** A break-in service inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed **ONLY ONCE** following the first three months or the first 30 hours of operation after purchase of the unit and requires approximately **2.5 man-hours** per unit to complete.*

This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an authorized Generac Service Dealer.

- 3** An operational inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

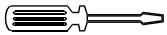
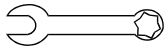
*Performed semi-annually or following each 50 hours of operation of the unit and requires approximately **1.5 man-hours** per unit to complete.*

This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an authorized Generac Service Dealer.

- 4** A mid-level inspection of the generator set to insure it is ready to operate and carry the load when required, and to identify any potential problem areas.

*Performed annually or following each 100 hours of operation of the unit and requires approximately **4.0 man-hours** per unit to complete.*

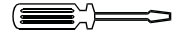
This inspection contains some maintenance tasks which require special tools, equipment, and/or knowledge to accomplish and should be performed only by an authorized Generac Service Dealer.

**MAINTENANCE****Section 6 – Scheduled Maintenance****Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators**

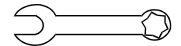
| Maintenance Tasks | Level 1 | Task Comp. (Date-Initials) | Level 2 | Task Comp. (Date-Initials) | Level 3 | Task Comp. (Date-Initials) | Level 4 | Task Comp. (Date-Initials) |
|--|---|----------------------------|--|----------------------------|--|----------------------------|--|----------------------------|
| | Recommended to be done monthly/ 10 hrs. | | Required to be done 3 months/ Break-in 30 hrs. | | Required to be done Semi-annually/ 50 hrs. | | Required to be done Annually/ 100 hrs. | |
| 1. Disable the unit from operating per the first page warning. | ○ | | ○ | | ○ | | ○ | |
| 2. Check the engine oil level. Adjust as necessary. | ○ | | ○ | | ○ | | ○ | |
| 3. Check the engine coolant level. Adjust as necessary. | ○ | | ○ | | ○ | | ○ | |
| 4. Check the engine coolant thermal protection level. Correct as necessary. | | | | | | | ○ | |
| 5. Check the natural gas delivery system on gas engine driven units. Tighten connections as necessary. | | | ○ | | ○ | | ○ | |
| 6. Check the diesel fuel supply level for diesel engine driven units. Fill as necessary. | ○ | | ○ | | ○ | | ○ | |
| 7. Drain water and sediment from the diesel fuel tank on diesel engine driven units. | | | ○ | | ○ | | ○ | |
| 8. Drain water from the fuel line water separator on diesel engine driven units if the unit is equipped with one. | | | ○ | | ○ | | ○ | |
| 9. Check the air inlets and outlets for debris. Clean as necessary. | ○ | | ○ | | ○ | | ○ | |
| 10. Check the battery electrolyte level if accessible. Adjust as necessary. | ○ | | ○ | | ○ | | ○ | |
| 11. Check the battery posts, cables, and charger for loose connections, corrosion, and proper operation. Correct as necessary. | ○ | | ○ | | ○ | | ○ | |
| 12. Check the unit wiring for loose connections, corrosion, and damage. Correct as necessary. | | | | | | | ○ | |
| 13. Check the engine accessory drive belts for wear, weather cracking, and damage. Replace as necessary. | | | | | | | ○ | |

Section 6 – Scheduled Maintenance

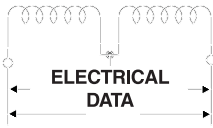
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators



MAINTENANCE



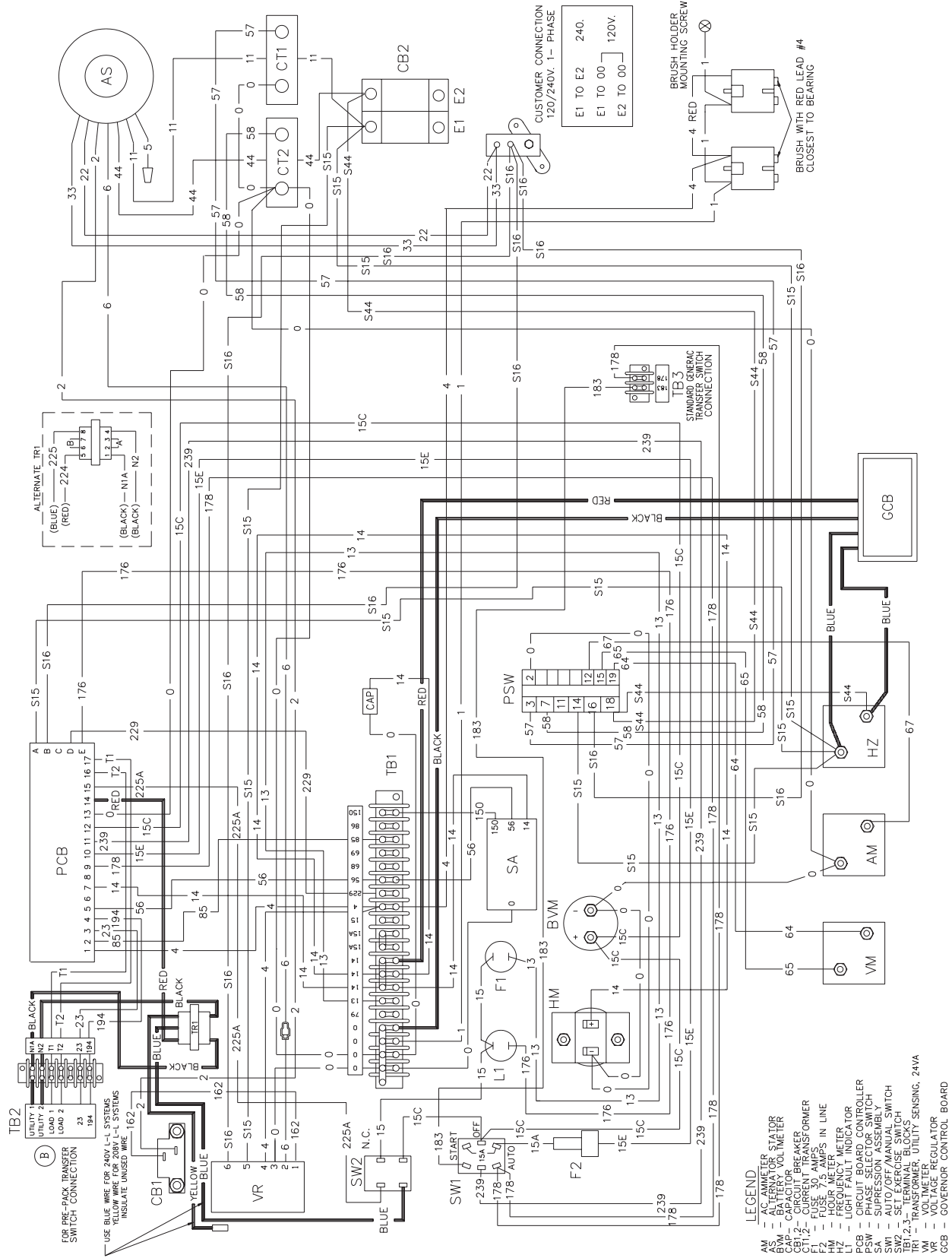
| Maintenance Tasks | Level 1 | Task Comp. (Date-Initials) | Level 2 | Task Comp. (Date-Initials) | Level 3 | Task Comp. (Date-Initials) | Level 4 | Task Comp. (Date-Initials) |
|---|---|----------------------------|--|----------------------------|--|----------------------------|--|----------------------------|
| | Recommended to be done monthly/ 10 hrs. | | Required to be done 3 months/ Break-in 30 hrs. | | Required to be done Semi-annually/ 50 hrs. | | Required to be done Annually/ 100 hrs. | |
| 14. Visually inspect the unit looking for leaks, wear or damage, loose connections or components, and corrosion. Correct as necessary. | ○ | | ○ | | ○ | | ○ | |
| 15. Test the engine and transfer switch safety devices. Correct and/or adjust as necessary. | | | | | | | ○ | |
| 16. Initiate an automatic start and transfer of the unit to site load and exercise it for at least 1 hour looking for leaks, loose connections or components, and abnormal operating conditions. Correct as necessary. | | | ○ | | ○ | | | |
| 17. Start and exercise the unit at full rated load (use a load bank if the site load is not enough) for at least 2 hours looking for leaks, loose connections or components, and abnormal operating conditions. Correct as necessary. | | | | | | | ○ | |
| 18. Change the engine oil. | | | ○ | | | | ○ | |
| 19. Replace the engine oil filter(s). | | | ○ | | | | ○ | |
| 20. Replace the engine air filter(s). | | | | | | | ○ | |
| 21. Replace the engine fuel filter(s) on diesel engine driven units and re-prime the fuel system. | | | ○ | | | | ○ | |
| 22. Check the engine spark plugs on gas engine driven units. Clean and re-gap or replace as necessary. | | | ○ | | | | ○ | |
| 23. Perform a 5 minute no-load operational run of the unit looking for any post service problems. | | | ○ | | | | ○ | |
| 24. Return the unit to standby setup for operation when required. | ○ | | ○ | | ○ | | ○ | |



Section 7 - Electrical Data

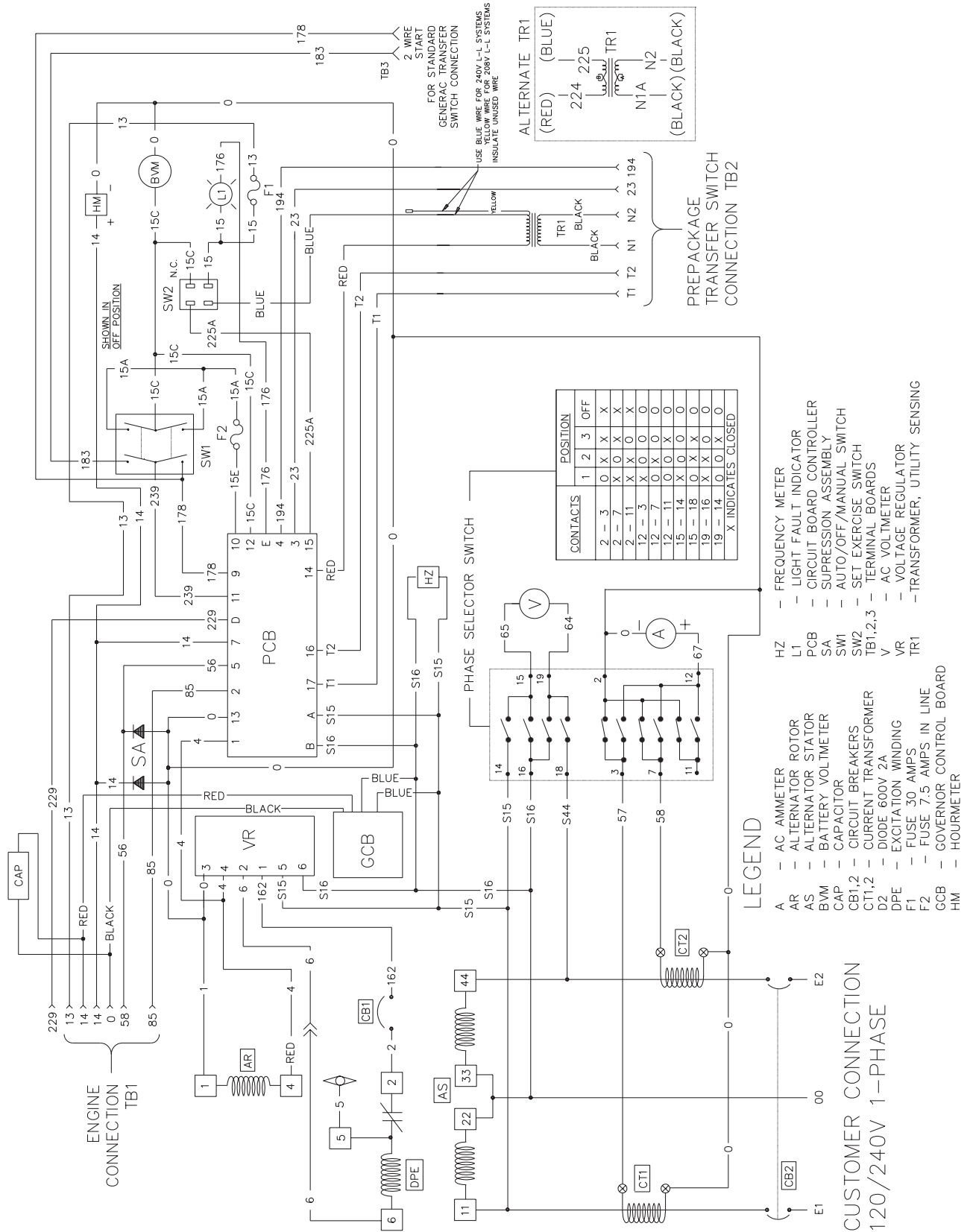
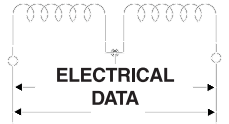
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Wiring Diagram – Control Panel (1-Phase) – Drawing No. 0A2803-D



Section 7 - Electrical Data

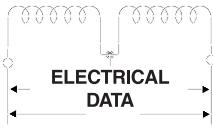
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
 Electrical Schematic – Control Panel (1-Phase) – Drawing No. 0A2802-B



LEGEND

- A - AC AMMETER
- AR - ALTERNATOR ROTOR
- AS - ALTERNATOR STATOR
- BVM - BATTERY VOLTMETER
- CAP - CAPACITOR
- CB1,2 - CIRCUIT BREAKERS
- CT1,2 - CURRENT TRANSFORMER
- D2 - DIODE 600V 2A
- DPE - EXCITATION WINDING
- F1 - FUSE 30 AMPS
- F2 - FUSE 7.5 AMPS IN LINE
- GCB - GOVERNOR CONTROL BOARD
- HM - HOURMETER
- HZ - FREQUENCY METER
- L1 - LIGHT FAULT INDICATOR
- PCB - CIRCUIT BOARD CONTROLLER
- SA - SUPPRESSION ASSEMBLY
- SW1 - AUTO/OFF/MANUAL SWITCH
- SW2 - SET EXERCISE SWITCH
- TB1,2,3 - TERMINAL BOARD
- V - AC VOLTMETER
- VR - VOLTAGE REGULATOR
- TR1 - TRANSFORMER, UTILITY SENSING

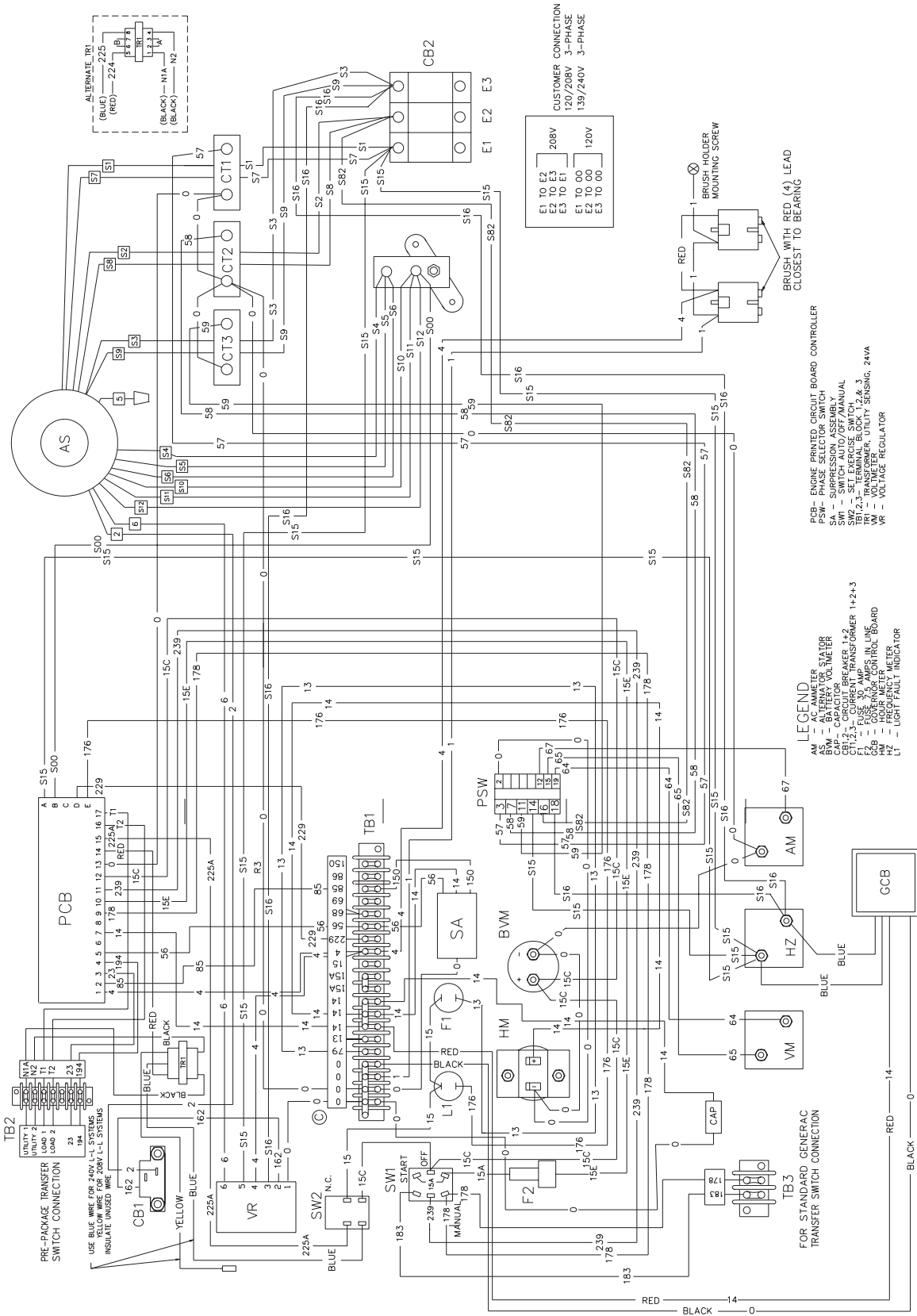
CUSTOMER CONNECTION
 120/240V 1-PHASE



Section 7 - Electrical Data

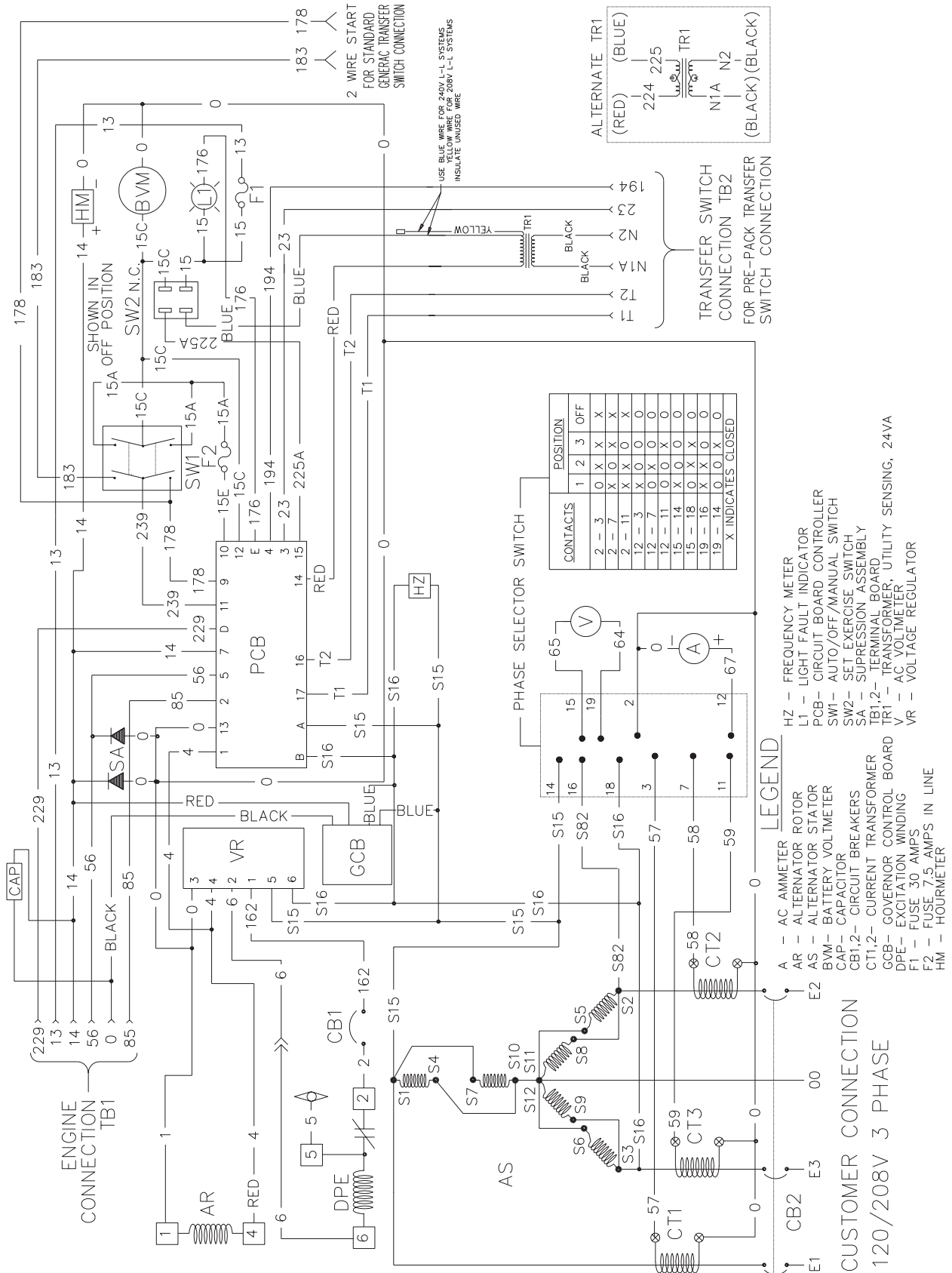
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

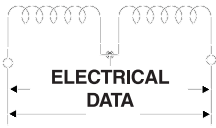
Wiring Diagram – Control Panel (3-Phase) – Drawing No. 0A2804-D



Section 7 - Electrical Data

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators Electrical Schematic – Control Panel (3-Phase) – Drawing No. 0A2805-C

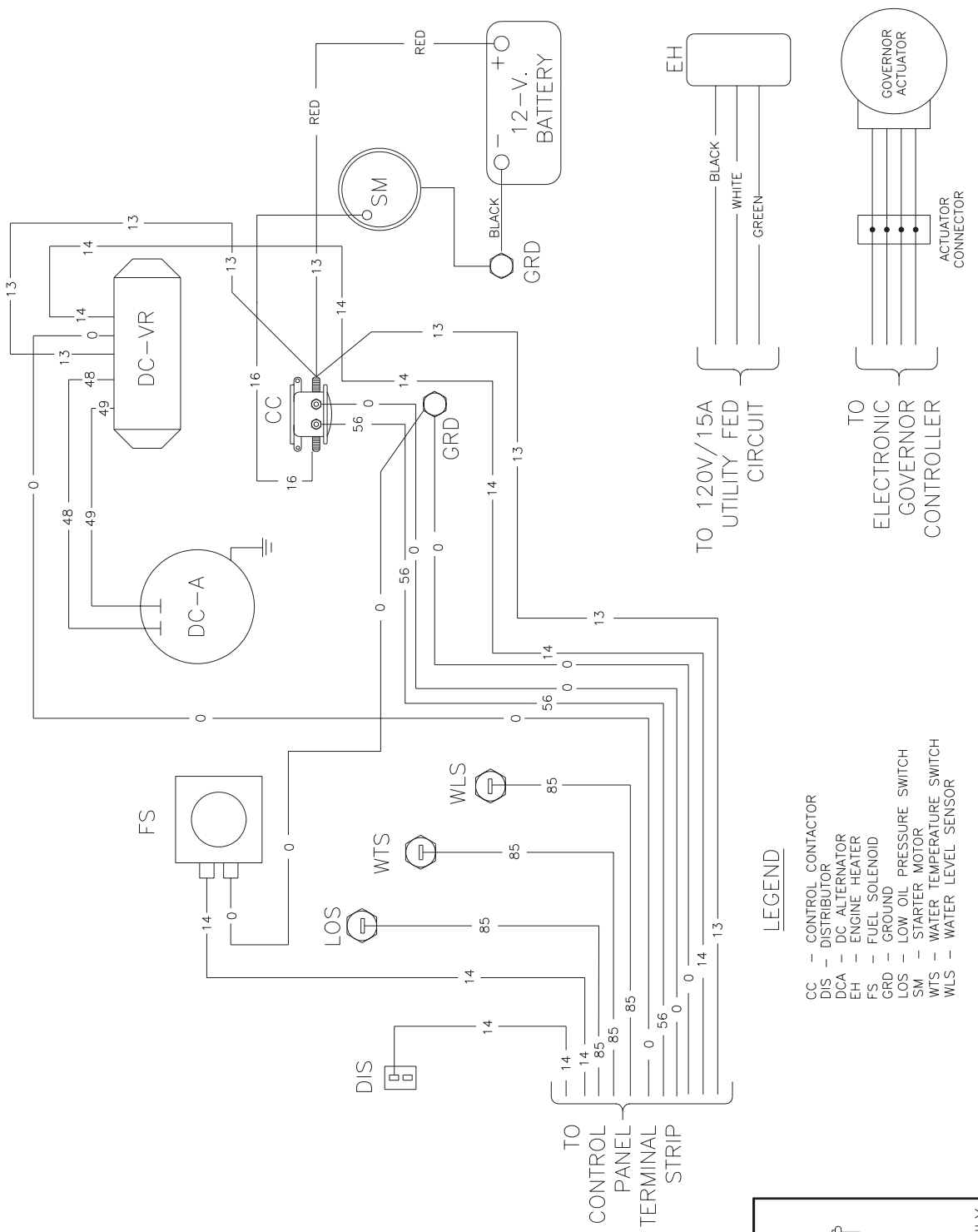




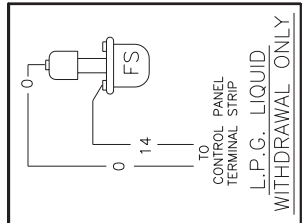
Section 7 - Electrical Data

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Wiring Diagram – 1.5L Gas Engine – Drawing No. 0A7176-A



- LEGEND**
- CC – CONTROL CONTACTOR
 - DIS – DISTRIBUTOR
 - DCA – DC ALTERNATOR
 - EH – ENGINE HEATER
 - FS – FUEL SOLENOID
 - GRD – GROUND
 - LOS – LOW OIL PRESSURE SWITCH
 - SM – STARTER MOTOR
 - WTS – WATER TEMPERATURE SWITCH
 - WLS – WATER LEVEL SENSOR



TO 120V/15A UTILITY FED CIRCUIT

TO ELECTRONIC GOVERNOR CONTROLLER

Section 7 - Electrical Data

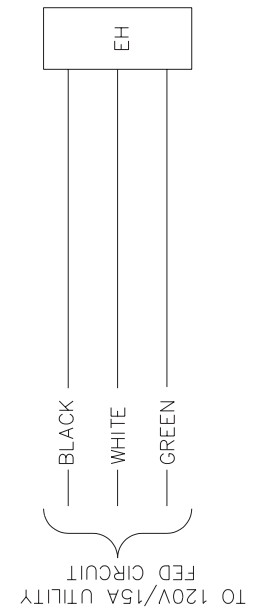
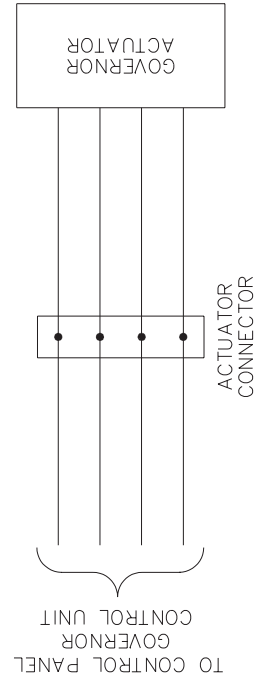
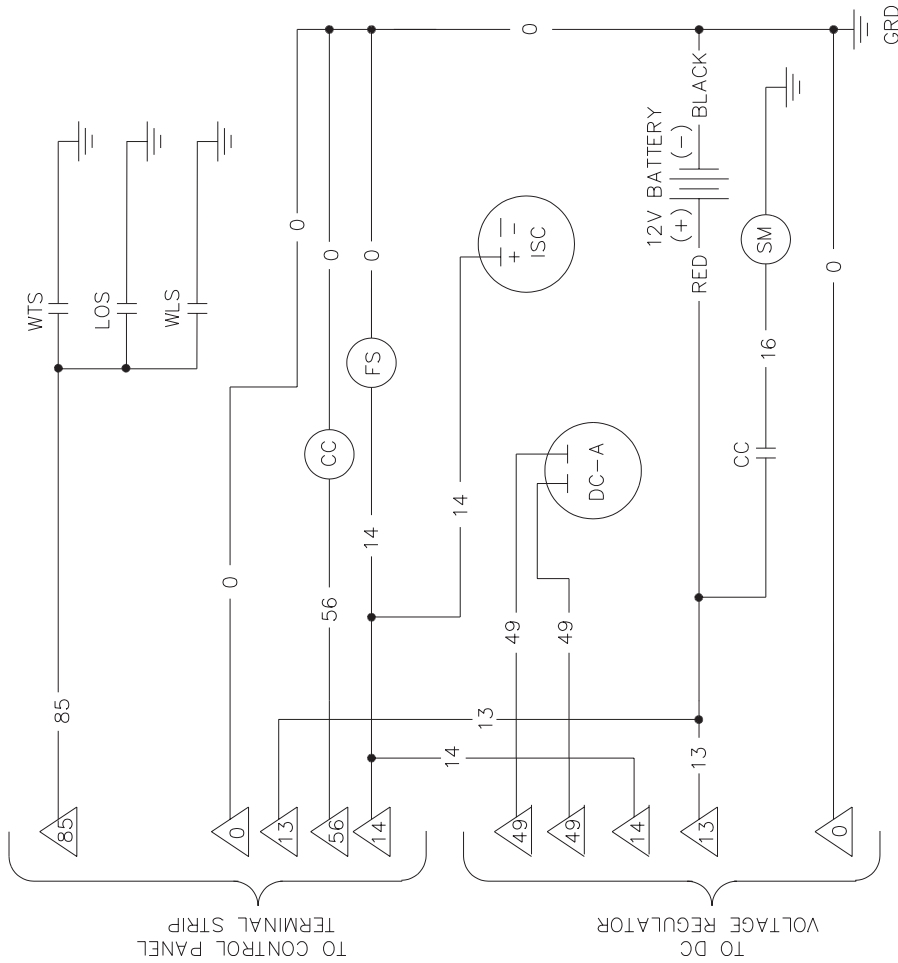
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Electrical Schematic – 1.5L Gas Engine – Drawing No. 0A7182-A



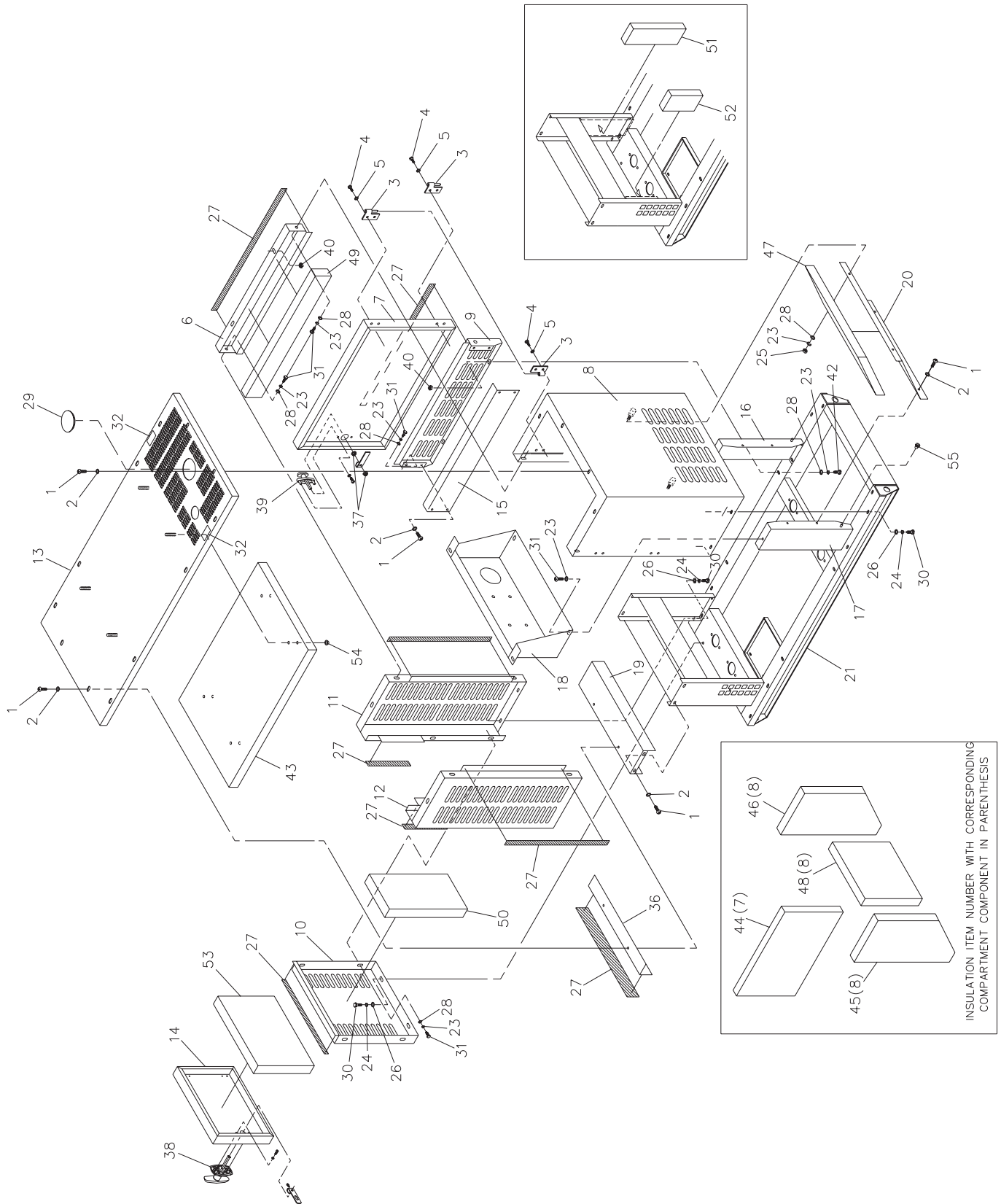
LEGEND

- CC - CONTROL CONTACTOR
- DCA - DC ALTERNATOR
- EH - ENGINE HEATER
- FS - FUEL SOLENOID
- GRD - GROUND
- ISC - IGNITION SYSTEM CONTACT
- LOS - LOW OIL SWITCH
- SM - STARTER MOTOR
- WTS - WATER TEMPERATURE SWITCH
- WLS - WATER LEVEL SWITCH



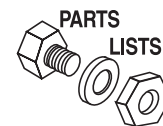
Section 8 - Exploded Views and Parts

**Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Enclosure – Drawing No. 0C1404-B**



Section 8 - Exploded Views and Parts

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Enclosure – Drawing No. 0C1404-A

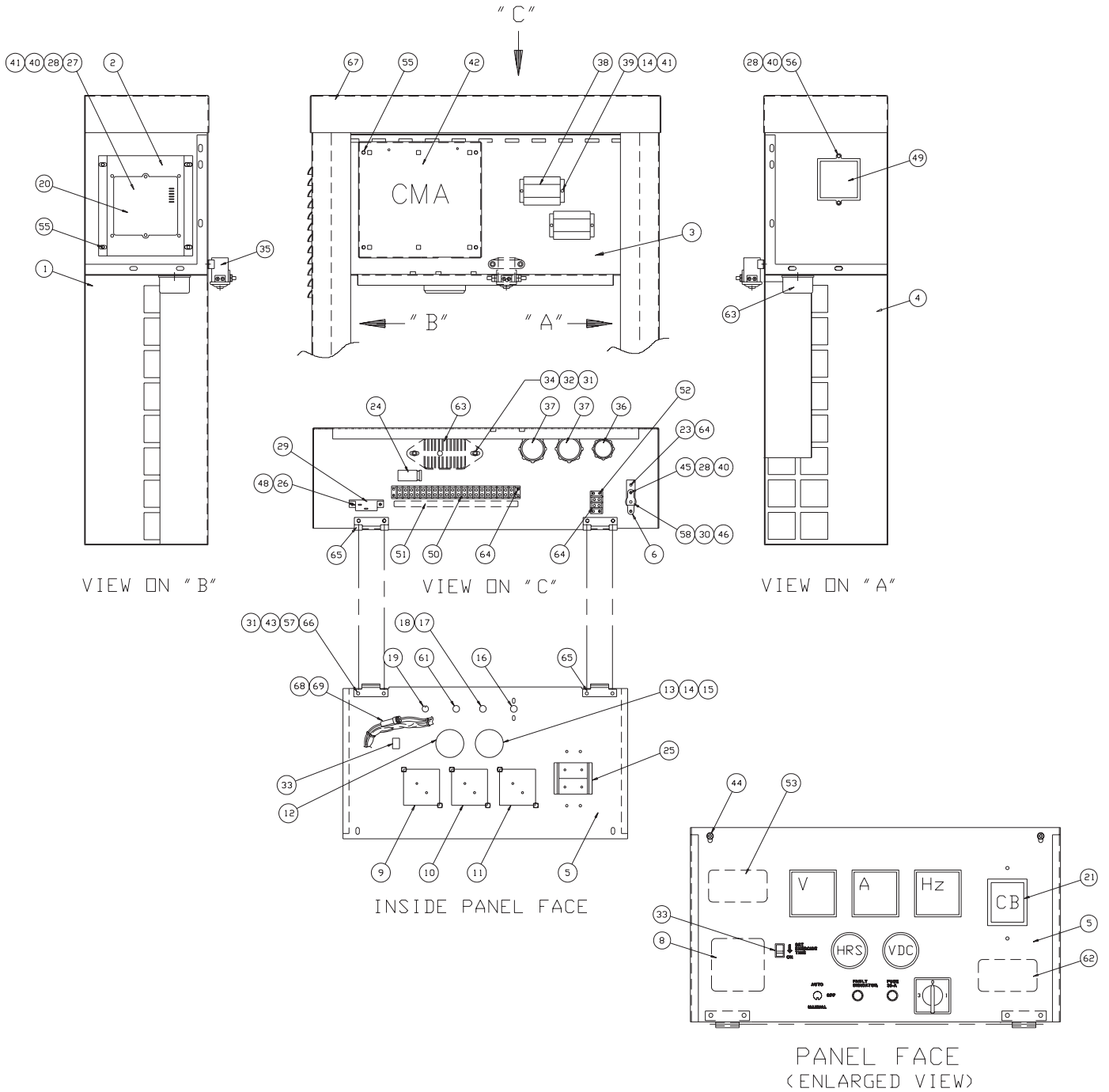


| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|-------------------------------|------|----------|-------|--------------------------------|
| 1 | 0A2110 | 32 | SCREW SWAGE 1/4-20 X 1/2 Z/YC | 27 | 089961 | 24ft. | FOAM STRIP 3/4 X 1/4 |
| 2 | 0A2115 | 32 | WASHER NYLON .250 | 28 | 022473 | 20 | WASHER FLAT 1/4 ZINC |
| 3 | 0A3133A | 4 | HINGE SLIP MALE LH | 29 | 082570 | 1 | PLUG PLASTIC 4 PLUG BTTN #425 |
| | 0A3133B | 4 | HINGE SLIP FEMALE LH | | | | |
| | 0A3133C | 2 | HINGE SLIP MALE RH | 30 | 039253 | 12 | SCREW HHC M8-1.25 X 20 G8.8 |
| | 0A3133D | 2 | HINGE SLIP FEMALE RH | 31 | 042568 | 14 | SCREW HHC M6-1.0 X 20 G8.8 |
| 4 | 0A3359 | 24 | SCREW BHSC M6-1.0 X 16 SS | 32 | 0D3397 | 2 | DECAL CAUTION HOT SURFACES |
| 5 | 0A3360 | 24 | SHAKEPROOF INT M6 SS | 36 | 0D3785 | 1 | BRACE REAR DOOR |
| 6 | 0C1245 | 1 | PANEL TOP SIDE LH | 37 | 037337 | 4 | NUT HEX JAM 3/8-24 SS |
| | 0C1245A | 1 | PANELTOP SIDE RH | 38 | 0A6807 | 1 | LATCH REWORK 48.5MM |
| 7 | 0A3449 | 2 | DOOR SIDE | 39 | 057042 | 2 | LATCH AND CAM |
| 8 | 0A4822 | 1 | PANEL FRONT | 40 | 067577 | 4 | NUT SPEED 1/4-20 |
| 9 | 0A4823 | 2 | PANEL SIDE BOTTOM | 42 | 022413 | 4 | SCREW HHC 1/4-20 X 1 G5 |
| 10 | 0A4824 | 1 | PANEL REAR | 43* | 0C1053B | 1 | INSULATION PANEL TOP |
| 11 | 0A4825 | 1 | CORNER POST REAR LH | 44* | 0C1053A | 2 | PANEL SIDE DOOR |
| 12 | 0A4826 | 1 | CORNER POST REAR RH | 45* | 0C1053E | 1 | INSULATION PANEL FRONT R.H. |
| 13 | 0C1193 | 1 | TOP ENCLOSURE 1.5 SAE | 46* | 0C1053F | 1 | INSULATION PANEL FRONT L.H. |
| 14 | 0A4831 | 1 | DOOR REAR | 47* | 0C1053G | 1 | INSULATION DUCT FRONT |
| 15 | 0A4832 | 2 | DUCT | 48* | 0C1053H | 1 | INSULATION PANEL FRONT TOP |
| 16 | 0C1067 | 1 | SUPPORT RADIATOR LH | 49* | 0C1053D | 2 | INSULATION PANEL DUCT SIDE TOP |
| 17 | 0C1067A | 1 | SUPPORT RADIATOR RH | | | | |
| 18 | 0C1068 | 1 | SUPPORT MUFFLER 1.5L | 50* | 0C1053J | 1 | INSULATION PANEL, REAR |
| 19 | 0C8817 | 1 | TOP CONTROL PANEL SAE | 51* | 0C1053K | 1 | INSULATION DUCT L.H. SIDE |
| 20 | 0C1244 | 1 | DUCT FRONT 1.5L SAE | 52* | 0C1053L | 1 | INSULATION DUCT R.H. SIDE |
| 21 | 0A9955 | 1 | BASE MOUNTING | 53* | 0C1053M | 1 | INSULATION DOOR REAR |
| 23 | 022097 | 16 | WASHER LOCK M6-1/4 | 54 | 078115 | 14 | WASHER SELF LOC/DOME |
| 24 | 022129 | 12 | WASHER LOCK M8-5/16 | 55 | 030486 | 2 | GROMMET 7/16 X 1/16 X 1/4 |
| 25 | 022127 | 4 | NUT HEX 1/4-20 STEEL | | | | |
| 26 | 022145 | 12 | WASHER FLAT 5/16 ZINC | | | | |

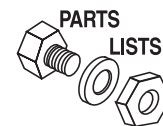
* NOTE: THESE PARTS ARE INCLUDED IN KIT 0C1053Z.

1Section 8 - Exploded Views and Parts

**Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Control Panel – Drawing No. 0C8847-C**



Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Control Panel – Drawing No. 0C8847-C



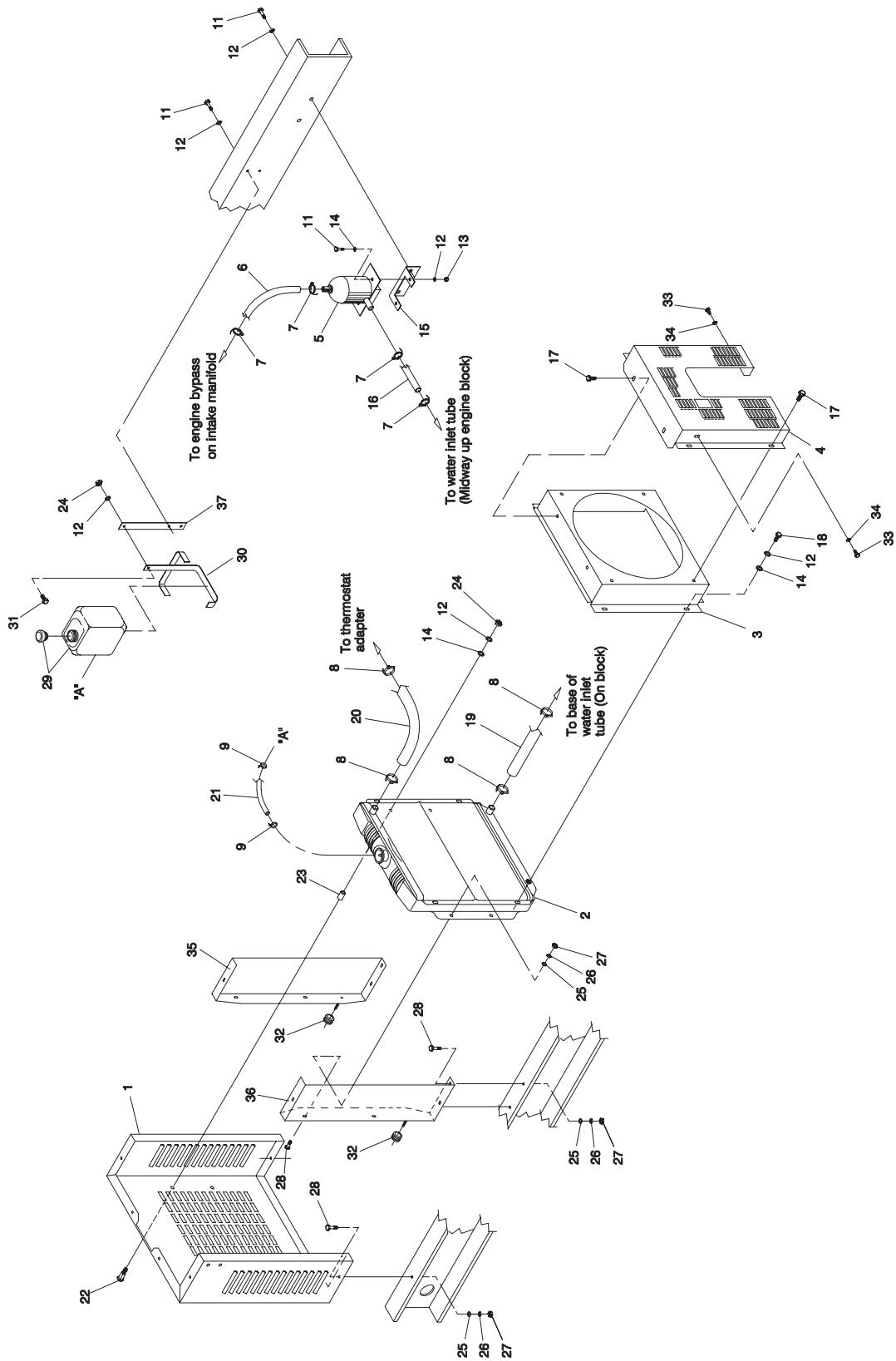
| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|--------------------------------|------|----------|------|--------------------------------|
| 1 | 0C5077 | 1 | SUPPORT, CONTROL PANEL L.H. | 37 | 063212 | 1 | GROMMET 1.75 X .12 X 1.50 |
| 2 | 075589 | 1 | BRACKET, VOLTAGE REGULATOR | 38 | 058318 | 2 | TRANSFRM 150A TO 5A 5VA |
| 3 | 0A1775 | 1 | CONTRLPANEL-BACK | 39 | 033121 | 2 | SCREW HHM 10-32 X 1/2 |
| 4 | 0C5078 | 1 | SUPPORT CONTROL PANEL R.H. | 40 | 049226 | 4 | WASHER LOCK M5 |
| 5 | 0C4224A | 1 | SILKSCREEN, PANEL (SAE) | 41 | 023897 | 10 | WASHER FLAT #10 ZINC |
| 6 | 057073 | 1 | BLOCK JUNCTION 3/8-16 | 42 | 075595 | 1 | ASSM.,CMA BOX |
| 7 | 022985 | 4 | WASHER FLAT #6 ZINC | 43 | 049811 | 8 | WASHER FLAT M6 |
| 8 | 081988 | 1 | DECAL EXERCISE INFO | 44 | 072355 | 2 | HHCS M6-1X12-A/C-.HD |
| 9 | 070043 | 1 | VOLTMETER AC 0-300 | 45 | 055440 | 1 | SCREW HHC M5-0.8 X 25 G8.8 |
| 10 | 070055 | 1 | AMMETER AC 0-100 | 46 | 022241 | 1 | NUT HEX 3/8-16 STEEL |
| 11 | 070042 | 1 | FREQUENCY METER 55-65HZ | 48 | 022155 | 2 | WASHER LOCK #6 |
| 12 | 070081 | 1 | HOURLMETER | 49 | 098647 | 1 | ASSY L.C. ELECT GOV |
| 13 | 076037 | 1 | VOLTMETER DC 8-18V | 50 | 057335 | 1 | BLOCK TERM 20A 20 X 6 X 1100V |
| 14 | 022152 | 10 | WASHER, LOCK #10 | 51 | 021480 | 1 | DECAL TERMINAL STRIP |
| 15 | 022158 | 10 | NUT, HEX #10-32 STEEL | 52 | 048766 | 1 | BLOCK TERM 20A 2 X 6 X 1100V |
| 16 | 061945 | 1 | SWITCH 6A AMP/V SELECTOR | 53 | 058589 | 1 | DECAL WARN ENG START |
| 17 | 032300 | 1 | HOLDER, FUSE | 54* | 070882 | 1 | ASSY SUPPRESSION |
| 18 | 022668 | 1 | FUSE 30A X AGC30 HLDR22669 HKP | 55 | 0A7215 | 10 | SCREW SW 1/4-20X5/8 N WA JS500 |
| 19 | 076020 | 1 | SWITCH DPDT 15/10 SP ON-OFF-ON | 56 | 076040 | 2 | SCREW PPHM M5-0.8 X 16 |
| 20 | 083048 | 1 | ASY POTTED REG WOFIN | 57 | 049813 | 8 | NUT HEX M6-1.0 G8 YEL CHR |
| 21 | 0A2077 | 1 | CIRCT BRK 125X2 120/240V | 58 | 061979 | 1 | BUS BAR |
| 22 | 075476 | 14 | SCREW, PPHM-M4-0.7 x 16MM | 59* | 0A2833 | 1 | HARNESS PNL "PP" 1P |
| 23 | 022264 | 14 | WASHER, LOCK-M4 | 60* | 0A6821 | 1 | HARNESS WIRING (1.5L) |
| 24 | 0A3968 | 1 | CAPACITOR, FILTER ASSY. | 61 | 064009 | 1 | LIGHT 12VDC .02A LED RED PILOT |
| 25 | 039782 | 1 | BRACKET CIRCT BRK MOUNTING | 62 | 064009 | 1 | DECAL, TRANS. SWITCH CONN. |
| 26 | 0C2323 | 2 | SCREW TAPTITE PH 6-32X5/8 ZYC | 63 | 0A1354A | 1 | REGULATOR - DC ALT |
| 27 | 076039 | 2 | SCREW PPHM M5-0.8 X 40 | 64 | 0C2212 | 6 | SCREW TAPTITE PH M4-0.7X16 ZYC |
| 28 | 051756 | 3 | SCREW HHC M10-1.5 X 20 G8.8 | 65 | 0C3826 | 2 | HINGE, CONTROL PANEL |
| 29 | 048476 | 1 | CIRCT BRK 4.5X1 AUT30KW CNT45K | 66 | 0C4427 | 8 | M6X1.0X12 T.H.M.S SS |
| 30 | 022237 | 1 | WASHER LOCK 3/8 | 67 | 0C8817 | 1 | TOP, CONTROL PANEL (SAE) |
| 31 | 022097 | 8 | WASHER LOCK M6-1/4 | 68** | 0D5324 | 1 | FUSE & HOLDER LITTLE 7.5A |
| 32 | 022473 | 8 | WASHER FLAT 1/4 ZINC | 69** | 0A9611 | REF | FUSE 7.5AXBK/AGC7.5NX |
| 33 | 082573 | 1 | SWITCH DPST 5 125V SPD RCKR | | | | |
| 34 | 043116 | 4 | SCREW HHC M6-1.0 X 12 G8.8 | | | | |
| 35 | 056739 | 1 | RELAY SOLENOID 12VDC PNL MNT | | | | |
| 36 | 072252 | 2 | GROMMET 1.37 X .06 X 1.00 | | | | |

* NOT SHOWN ON THIS ASSEMBLY

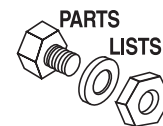
** PART OF CONTROL PANEL WIRE HARNESS

Section 8 - Exploded Views and Parts

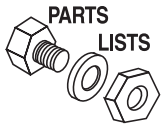
**Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Radiator – Drawing No. 0C1406-B**



Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Radiator – Drawing No. 0C1406-B



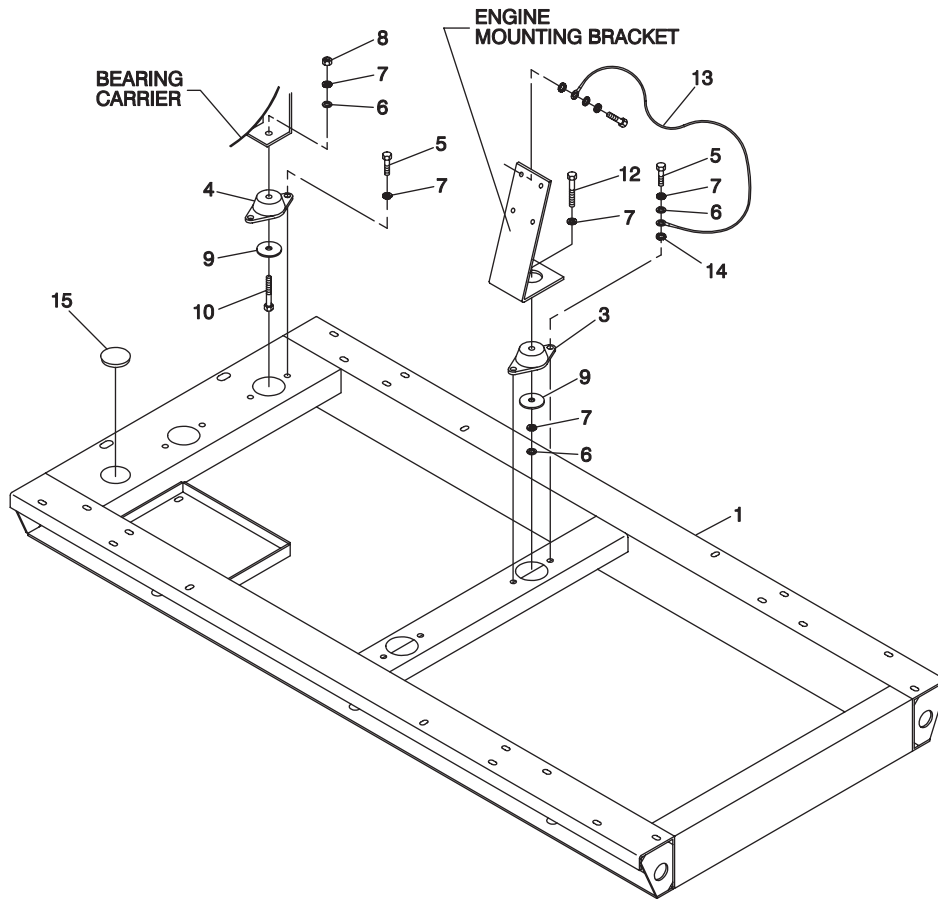
| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|--------------------------------|
| 1 | 0A4822 | 1 | PANEL FRONT |
| 2 | 0A5734 | 1 | RADIATOR 1.5L |
| 3 | 0A6237 | 1 | VENTURI 1.5L |
| 4 | 0A6238 | 1 | GUARD FAN |
| 5 | 084918 | 1 | HEATER 500W 1020 |
| 6 | 050967 | 12" | HOSE RES 5/8 RIA 250F |
| 7 | 057823 | 4 | CLAMP HOSE #10 .56 - 1.06 |
| 8 | 099502 | 4 | CLAMP HOSE #24 1.06 - 2.00 |
| 9 | 083709 | 2 | CLAMP WIRE HOSE .573 - .551 |
| 11 | 042568 | 6 | SCREW HHC M6-1.0 X 20 G8.8 |
| 12 | 022097 | 15 | WASHER LOCK M6-1/4 |
| 13 | 049813 | 2 | NUT HEX M6 -1.0 G8 YEL CHR |
| 14 | 022473 | 11 | WASHER FLAT M6-1/4 ZINC |
| 15 | 084427 | 1 | BRACKET HEATER |
| 16 | 050967 | 18" | HOSE RES 5/8 RIA 250F |
| 17 | 075443 | 6 | CRMPTIT 1/4-20 X 5/8 |
| 18 | 056892 | 4 | CRMPTIT 10-24 X 3/8 |
| 19 | 0A6284 | 1 | HOSE LOWER RADIATOR |
| 20 | 0A6258 | 1 | HOSE UPPER RADIATOR |
| 21 | 029032 | 1 | HOSE 9/32 ID |
| 22 | 031669 | 4 | BOLT CARR 1/4-20 X 1-3/4 JS500 |
| 23 | 060035 | 4 | SPACER .41 X .75 X .87 ST/ZNC |
| 24 | 022127 | 5 | NUT HEX 1/4-20 STEEL |
| 25 | 022145 | 12 | WASHER FLAT 5/16 ZINC |
| 26 | 022129 | 12 | WASHER LOCK M8-5/16 |
| 27 | 045771 | 12 | NUT HEX M8-1.25 G8 YEL CHR |
| 28 | 042907 | 12 | SCREW HHC M8-1.25 X 16 G8.8 |
| 29 | 076749 | 1 | TANK COOLANT RECOVERY |
| 30 | 080712 | 1 | BRACKET COOLANT RECOVERY TANK |
| 31 | 0A7215 | 1 | SCREW SW 1/4-20X5/8 N WA JS500 |
| 32 | 030486 | 2 | GROMMET 7/16 X 1/16 X 1/4 |
| 33 | 0A2111 | 2 | SCREW SWAGE 10-32 X 5/16 Z/YC |
| 34 | 065852 | 2 | NUT SPRINGCLIP .37 - .62 |
| 35 | 0C1067A | 1 | SUPPORT RADIATOR RH |
| 36 | 0C1067 | 1 | SUPPORT RADIATOR LH |
| 37 | 0C1480 | 1 | BRACKET COOLANT BOTTLE |



Section 8 - Exploded Views and Parts

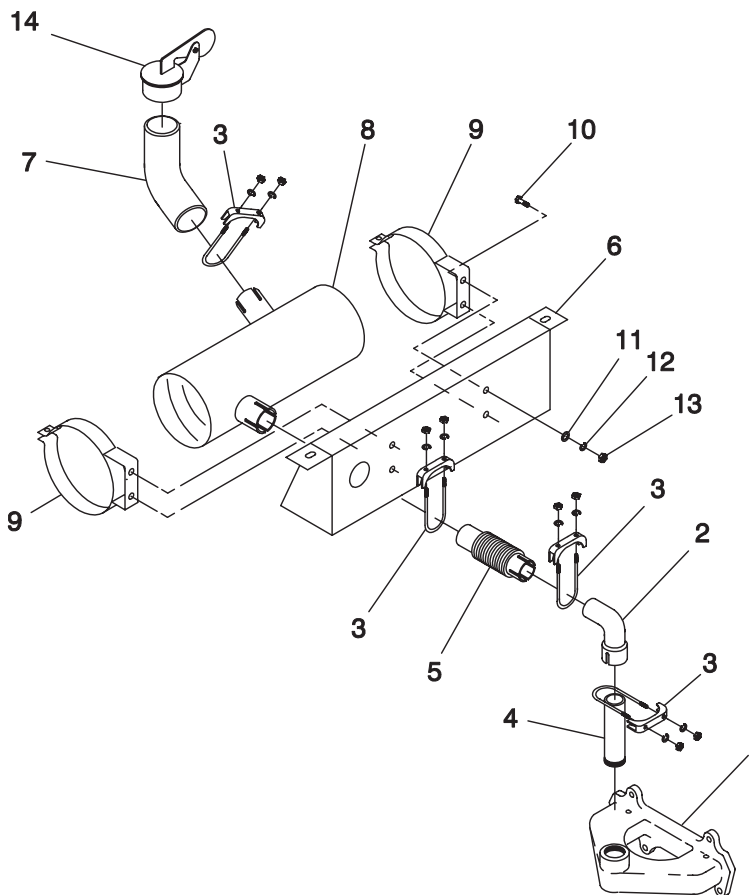
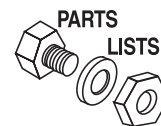
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Exploded View – Radiator – Drawing No. 0C1405-A

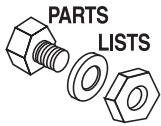


| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|--------------------------------|
| 1 | 0A9955 | 1 | BASE MOUNTING |
| 3 | 070936 | 2 | DAMPENER VIBRATION |
| 4 | 070936C | 2 | DAMPENER VIBRATION |
| 5 | 039253 | 8 | SCREW HHC M8-1.25 X 20 G8.8 |
| 6 | 022145 | 12 | WASHER FLAT 5/16 ZINC |
| 7 | 022129 | 12 | WASHER LOCK M8-5/16 |
| 8 | 045771 | 12 | NUT HEX M8-1.25 G8 YEL CHR |
| 9 | 071956 | 4 | WASHER FLAT M8 |
| 10 | 051730 | 2 | SCREW HHC M8-1.25 X 60 G8.8 |
| 12 | 057821 | 2 | SCREW HHC M8-1.25 X 40 G8.8 |
| 13 | 021991 | 1 | EARTH STRAP |
| 14 | 027482 | 2 | WASHER SHAKEPROOF EXT 5/16 STL |
| 15 | 0A2308 | 1 | PLUG BUTTON 2" DIA |

Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Muffler – Drawing No. 0C1408-B



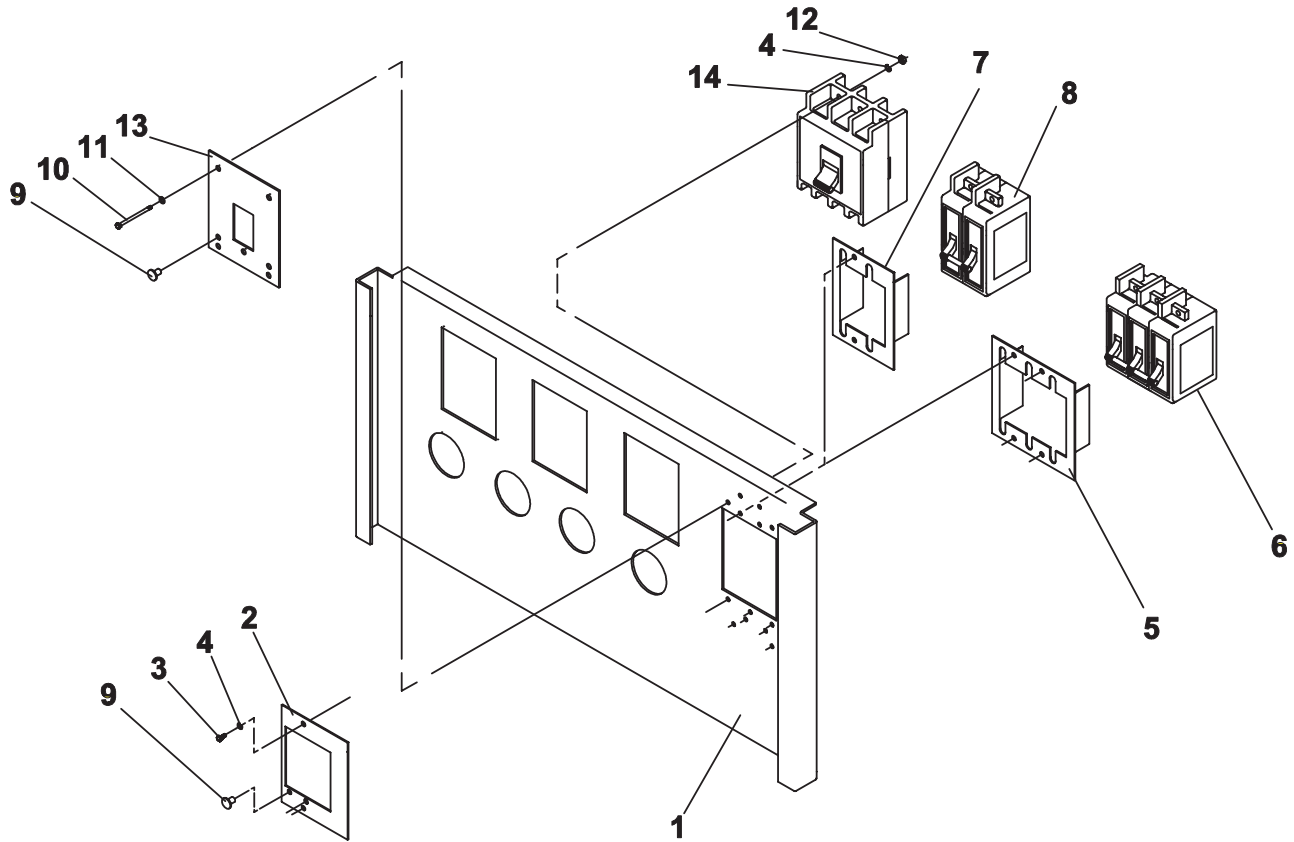
| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|----------------------------------|
| 1 | 0A4355 | 1 | MANIFOLD EXHAUST 1.5L |
| 2 | 0C1636 | 1 | NIPPLE TOE 1.5 NPT X 6.5 BL IRON |
| 3 | 036434 | 4 | BOLT U 5/16-18 X 2.09 |
| | 036449 | 4 | SADDLE 2 INCH |
| 4 | 0C1330 | 1 | PIPE EXHAUST |
| 5 | 0C1318 | 1 | FLEX PIPE EXHAUST |
| 6 | 0C1068 | 1 | SUPPORT MUFFLER 1.5L |
| 7 | 0C1412 | 1 | ELBOW EXHAUST 45 DEG |
| 8 | 0A5728 | 1 | MUFFLER 1.6/1.5L SAE |
| 9 | 060366 | 2 | STRAP MUFFLER 6" DIA |
| 10 | 066889 | 4 | SCREW HHC M8 X 1.25 X 20MM |
| 11 | 022145 | 4 | WASHER FLAT 5/16 ZINC |
| 12 | 022129 | 4 | WASHER LOCK M8-5/16 |
| 13 | 045771 | 4 | NUT HEX M8-1.25 G8 YEL CHR |
| 14 | 0A8974 | 1 | CAP RAIN 2" |



Section 8 - Exploded Views and Parts

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Exploded View – Circuit Breaker – Drawing No. 0A3371-B

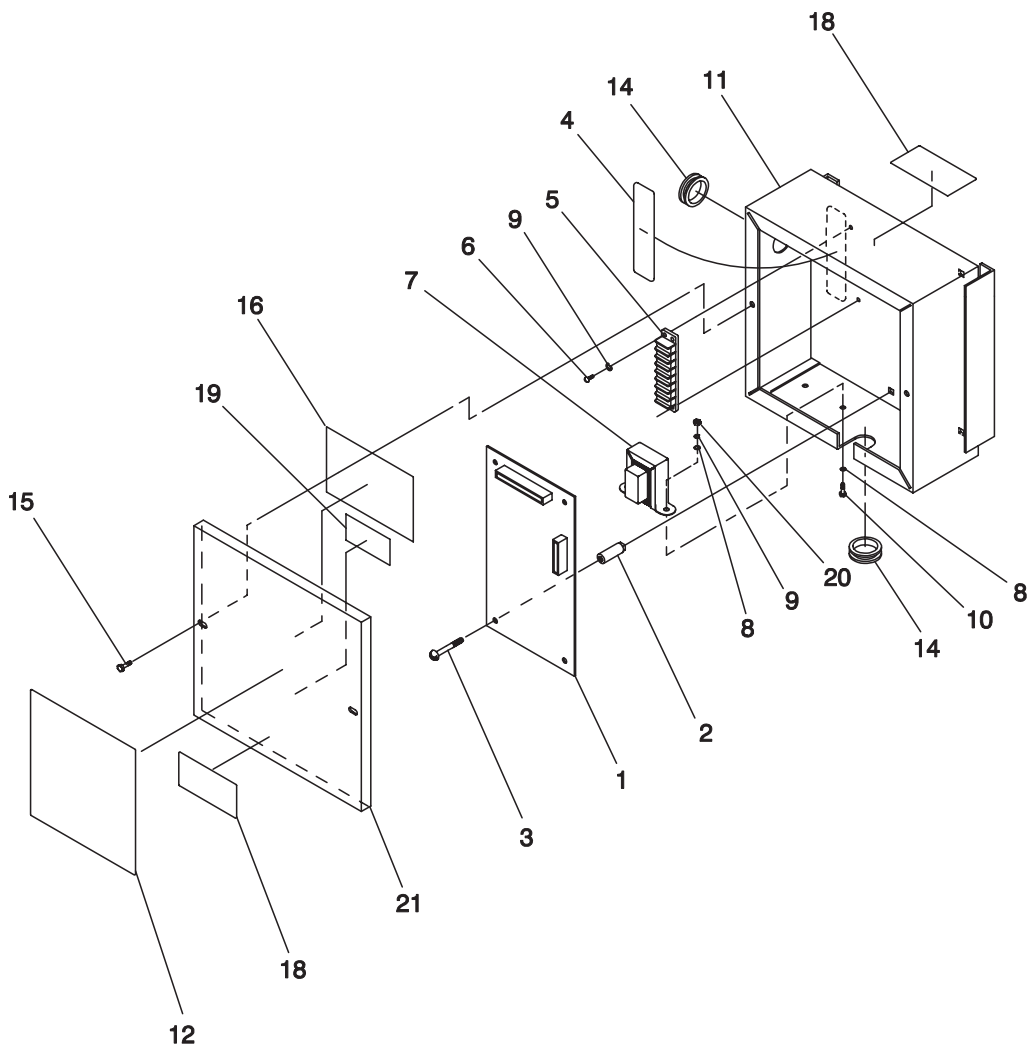
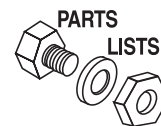


| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|--------------------------------|--------|----------|--------------------------------|-------------------------|
| 1 | 0A2103 | 1 | SILKSCREEN "A" PANEL | 57905 | 1 | CIRCT BRK 45X2 240V | |
| | 0A2104 | 1 | SILKSCREEN "B" PANEL | 039765 | 1 | CIRCT BRK 50X2 240V 39782 BRKT | |
| | 0A2105 | 1 | SILKSCREEN "C" PANEL | 048373 | 1 | CIRCT BRK 70X2 240V | |
| | 0A2106 | 1 | SILKSCREEN "P" PANEL | 063452 | 1 | CIRCT BRK 80X2 240V | |
| 2* | 0A2052 | 1 | COVER BQ CIRCUIT BREAKER | 039766 | 1 | CIRCT BRK 90X2 240V | |
| 3 | 033130 | - | SCREW HHM #8-32 X 1/4 | 048374 | 1 | CIRCT BRK 100X2 240V | |
| 4 | 022264 | - | WASHER LOCK M4 | 0A2077 | 1 | CIRCT BRK 125X2 120/240V | |
| 5 | 039783 | 1 | BRACKET MOUNTING CIRCT BRK | 9 | 056967 | 3 | PLUG PLASTIC .375 |
| 6 | 080522 | 1 | CIRCT BRK 20 X 3 INACTIVE | 10 | 053640 | 4 | SCREW RHM #8-32 X 3-1/4 |
| | 047585 | 1 | CIRCT BRK 30 X 3 240V MT PL | 11 | 038150 | 4 | WASHER FLAT #8 ZINC |
| | 057906 | 1 | CIRCT BRK 35 X 3 240V | 12 | 022471 | 4 | NUT HEX #8-32 STEEL |
| | 056783 | 1 | CIRCT BRK 40X3 240V | 13** | 0A2670 | 1 | COVER,CIR.BRKR. 480V |
| | 049942 | 1 | CIRCT BRK 50X3 W/MOUNT PL ITE | 14 | 0A2820 | 1 | MCB 16A 3P 480V B-TR |
| | 040533 | 1 | CIRCT BRK 60X3 240V | | 0A2821 | 1 | MCB 25A 3P 480V B-TR |
| | 049135 | 1 | CIRCT BRK 70 X 3 240V | | 0A2822 | 1 | MCB 32A 3P 480V B-TR |
| | 062812 | 1 | CIR BKR 80-A 3P BQ3 | | 0A2828 | 1 | MCB 40A 3P 480V B-TR |
| | 053691 | 1 | CIRCT BRK 90 X 3 ITE BQ3-B090 | | | | |
| | 040532 | 1 | CIRCT BRK 100X3 240V 39783 BR | | | | |
| 7 | 039782 | 1 | BRACKET MOUNTING CIRCT BRK | | | | |
| 8 | 076640 | 1 | CIRCT BRK 20 X 2 ITE BQ2-B020 | | | | |
| | 057903 | 1 | CIRCT BRK 25 X 2 240V ITE | | | | |
| | 057472 | 1 | CIRCT BRK 30 X 2 240V ITE | | | | |
| | 077906 | 1 | CIRCT BRK 35X2 W/39782 BRACKET | | | | |
| | 043240 | 1 | CIRCT BRK 40X2 240V | | | | |

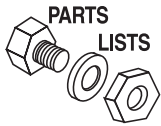
* USE WITH ITEM 14 ONLY

** USE WITH ITEM 8 ONLY

Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – CMA Assembly – Drawing No. 081086-D



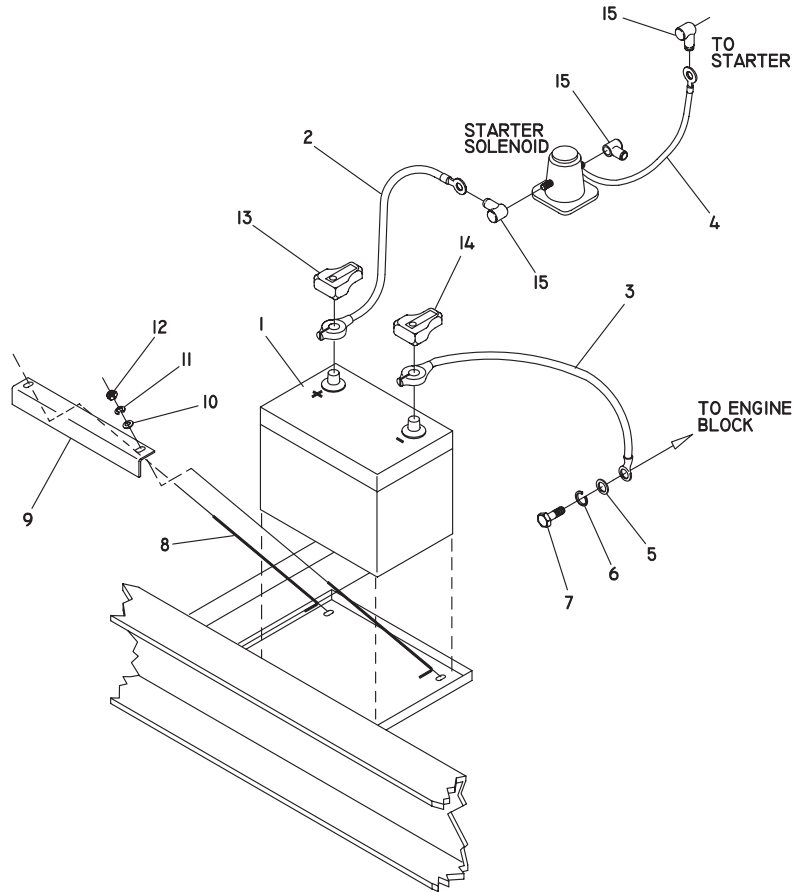
| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|-------|---|------|----------|------|------------------------------|
| 1 | 074100 | 1 | ASSY HOME STDBY LOGIC (MODELS 921, 863, 865) | 14 | 038057 | 2 | GROMMET 7/8 X 1/16 X 3/4 |
| | 076009A | 1 | PP LOGIC ASM 50/60HZ (MODEL 9428) | 15 | 058443 | 2 | SCREW CRIMPTITE 1/4-20 X 5/8 |
| 2 | 072566 | 4 | NUT SPACER .250 PCB | 16 | 081224 | 1 | DECAL MFG NAMEPLATE |
| 3 | 080882 | 4 | SCREW PPH TAPPING #6X5/8 SS | 17* | 079682 | 1 | HARNESS CMA WIRE |
| 4 | 074978 | 1 | DECAL TERMINAL STRIP | 18 | 086093 | 2 | DECAL CMA WARNING |
| 5 | 047822 | 1 | BLOCK TERM 20A 7 X 6 X 1100V | 19 | 083736 | 1 | DECAL CSA GTS |
| 6 | 075476 | 2 | SCREW PPHM M4-0.7 X 16 | 20 | 051715 | 2 | NUT HEX M4-0.7 G8 YEL CHR |
| 7 | 083264 | 1 | TRANSFORMER ASM CMA 240/12V | 21 | 077401 | 1 | COVER SILKSCREEN CMA |
| 8 | 022985 | 4 | WASHER FLAT #6 ZINC | | | | * NOT SHOWN |
| 9 | 022264 | 4 | WASHER LOCK M4 | | | | |
| 10 | 051787 | 2 | SCREW HHC M4-0.7 X 16 G8.8 | | | | |
| 11 | 079847 | 1 | BOX CMA | | | | |
| 12 | 0A8504 | 1 | DECAL, CMA LABEL | | | | |
| | 0A8504A | 1 | DECAL, CMA LABEL | | | | |
| 13* | 022661V | .083' | TUBING SHRINK 19"ID RED | | | | |



Section 8 - Exploded Views and Parts

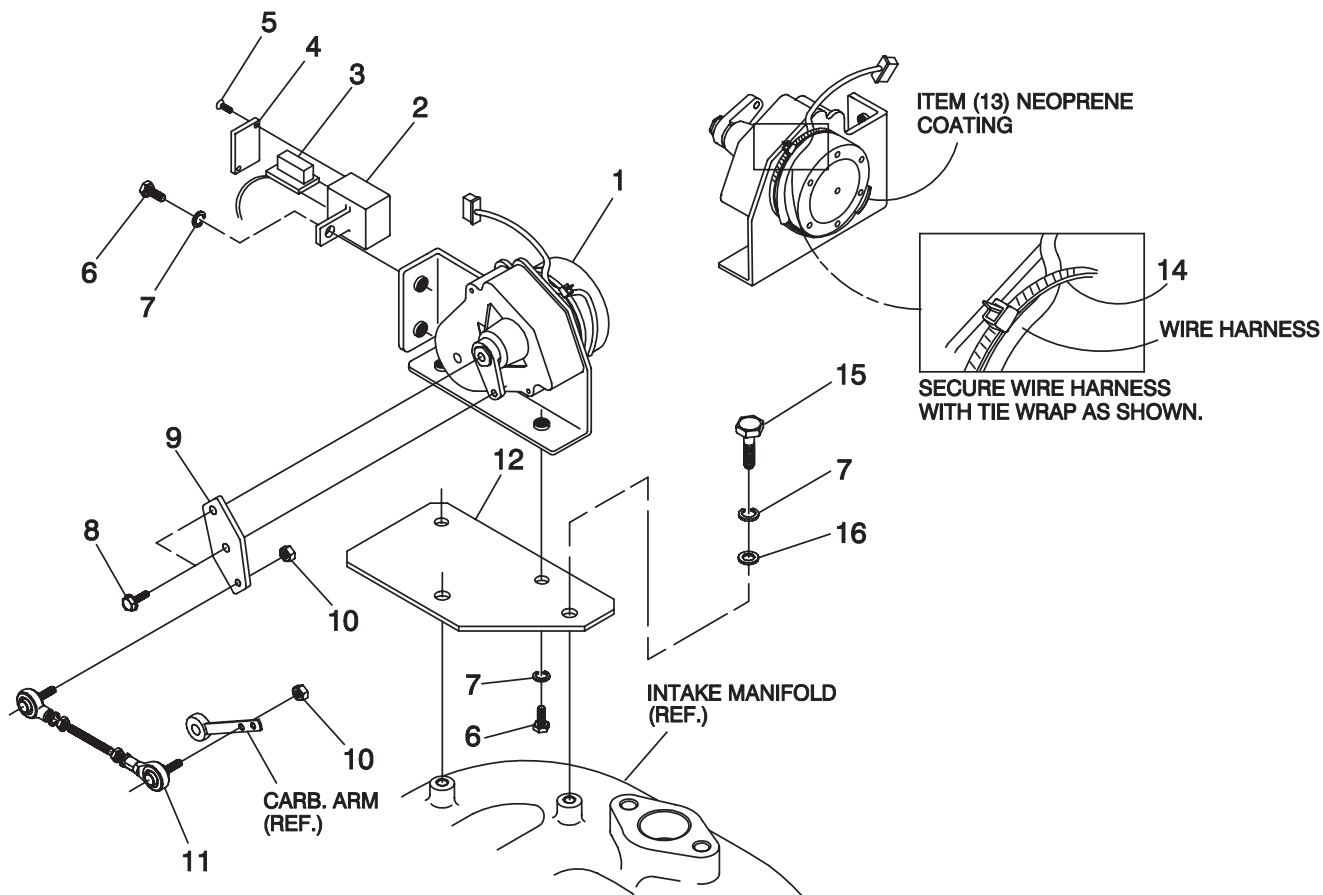
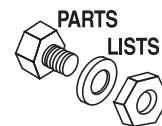
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

Exploded View – Battery – Drawing No. 098922-E



| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|------------|------|------------------------------|
| 1 | 077483 | 1 | BATT 12VDC 75-AH 26 |
| 2 | 038804D | 1 | CABLE BATT RED #4 X 20.00 |
| 3 | 038805B | 1 | CABLE BATT BLK #4 X 23.00 |
| 4 | 0742600131 | 1 | ASSY,WIRE#16 RED 1.6 |
| 5 | 022131 | 1 | WASHER FLAT 3/8 ZINC |
| 6 | 046526 | 1 | WASHER LOCK M10 |
| 7 | 052213 | 1 | SCREW HHC M10-1.25 X 20 G8.8 |
| 8 | 059567 | 2 | BOLT BATTERY HOLD DOWN |
| 9 | 078121 | 1 | BAR BATTERY HOLDDOWN |
| 10 | 022145 | 2 | WASHER FLAT M8-5/16 ZINC |
| 11 | 022129 | 2 | WASHER LOCK 5/16 |
| 12 | 022259 | 2 | NUT HEX 5/16-18 STEEL |
| 13 | 050331A | 1 | BATTERY POST COVER (RED+) |
| 14 | 050331 | 1 | BATTERY POSTCOVER (BLACK-) |
| 15 | 075763 | 3 | BOOT, BATTERY CABLE |

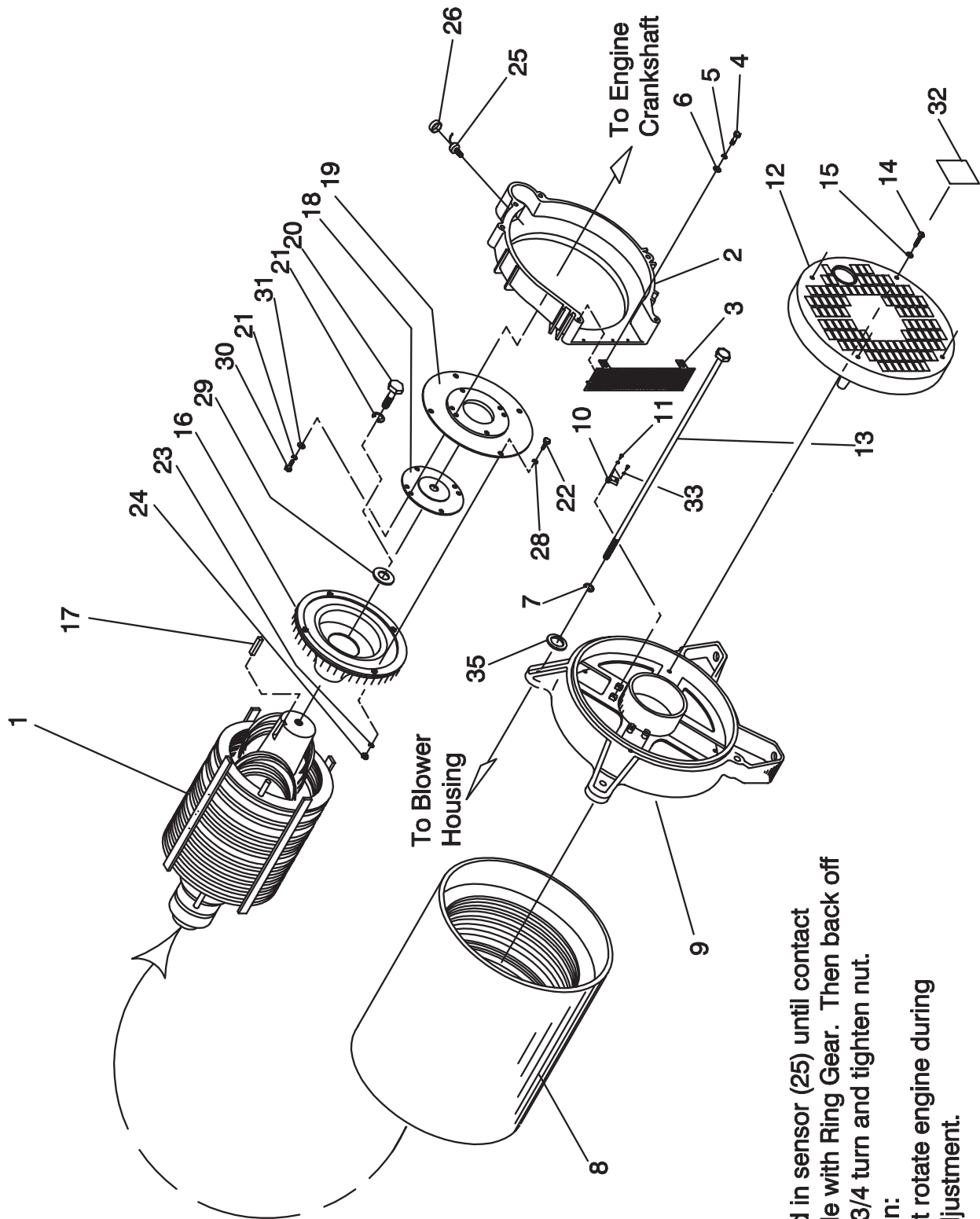
Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Governor Assembly – Drawing No. 0A7216-A



| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|--------------------------------|
| 1 | 098290 | 1 | ASM MOTOR STEPPER |
| 2 | 098941A | 1 | HOUSING GOVERNOR CONNECTOR |
| 3 | 098958A | 1 | CONNECTOR INTERFACE ASSEMBLY |
| 4 | 098942A | 1 | COVER CONNECTOR HOUSING |
| 5 | 098225 | 2 | SCREW FHM #2 X 5/8 SELF TAP |
| 6 | 043146 | 3 | SCREW HHC M6-1.0 X 10 G8.8 |
| 7 | 022097 | 5 | WASHER LOCK M6-1/4 |
| 8 | 064526 | 2 | SCREW HHM #6-32 X 3/8 SELF TAP |
| 9 | 098783 | 1 | LEVER STEPPER MOTOR |
| 10 | 037398 | 2 | NUT LOCK HEX #10-32 NYL INS |
| 11 | 0A7041 | 1 | ASSEMBLY CARBURATOR LINKAGE |
| 12 | 0A7106 | 1 | BRACKET STEPPER MOTOR |
| 13 | 074031 | - | LIQUID NEOPRENE |
| 14 | 029333A | 1 | TIE WRAP 7" BLACK |
| 15 | 022507 | 2 | SCREW HHC 1/4-20 X 1/2 G5 |
| 16 | 022473 | 2 | WASHER FLAT 1/4 ZINC |

Section 8 - Exploded Views and Parts

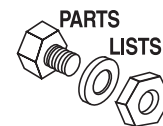
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View - Generator - Drawing No. 0A9348-B



Note:
Thread in sensor (25) until contact is made with Ring Gear. Then back off 1/2 to 3/4 turn and tighten nut.

Caution:
Do Not rotate engine during this adjustment.

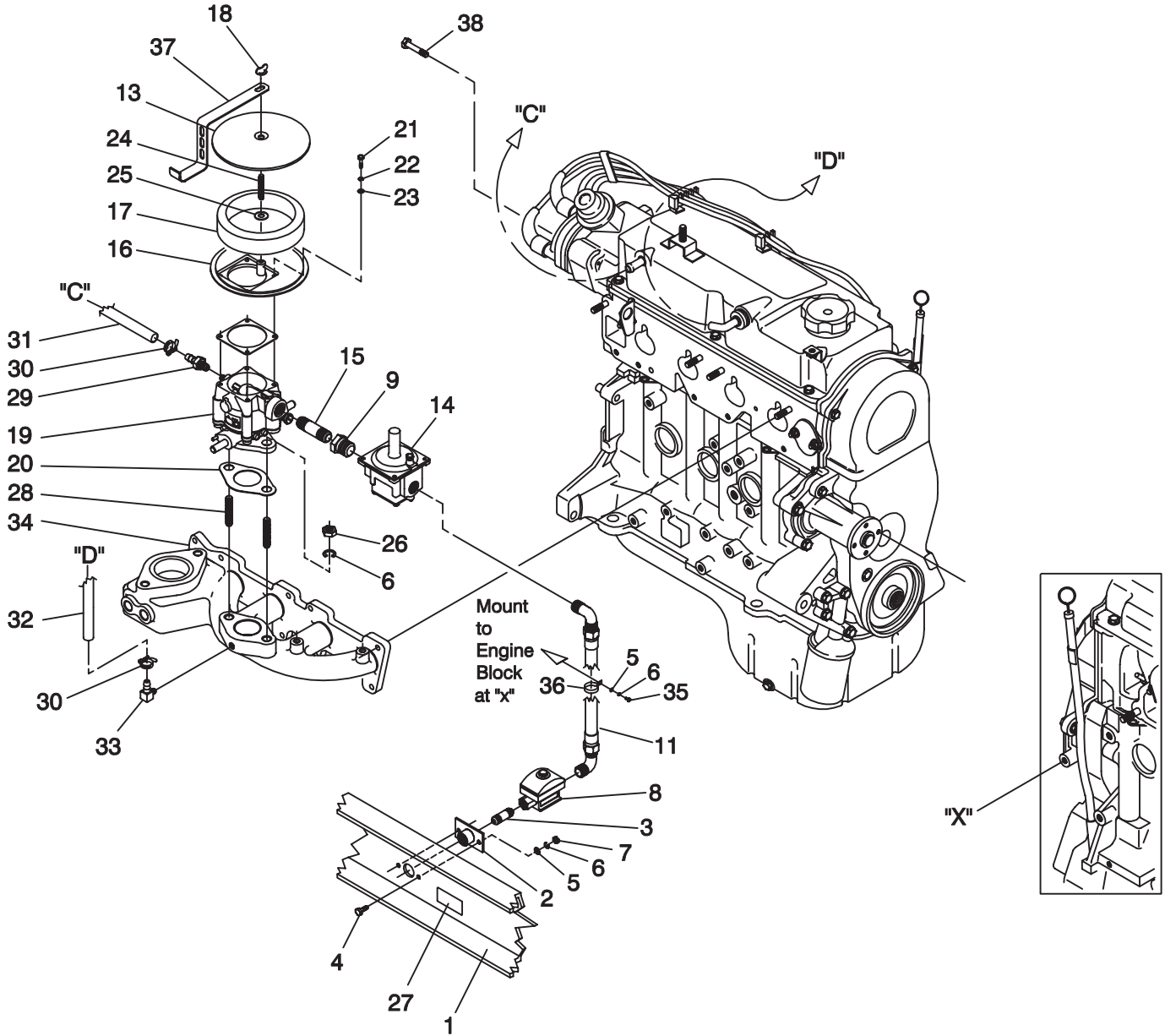
Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Generator – Drawing No. 0A9348-B



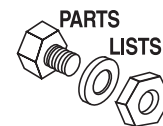
| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|------|-----------------------------|------|----------|------|--|
| 1 | 098671 | 1 | ASSY ROTOR 10KW | 13 | 075554B | 4 | BOLT,STATOR X 16"LG |
| | 098681 | 1 | ASSY ROTOR 15KW | 14 | 0A9375 | 4 | SCREW RHM #10-24 X 2 |
| | 098675 | 1 | ASSY ROTOR 20KW | 15 | 022152 | 4 | WASHER LOCK #10 |
| | 098936 | 1 | ASSY ROTOR 25KW | 16 | 097146 | 1 | FAN & RING GEAR ASSEM. |
| 2 | 0A5336A | 1 | HOUSING BLOWER | 17 | 042558 | 1 | KEY SQ 3/8 X 1 STEEL |
| 3 | 0A1659 | 1 | SCREEN AIR OUTLET | 18 | 0A5061 | 1 | SPACER-FLEX PLATE |
| 4 | 071912 | 4 | SCREW PPHM M5-0.8 X 8 | 19 | 0A4989 | 1 | PLATE, FLEX |
| 5 | 022152 | 4 | LOCK WASHER-#10 | 20 | 052213 | 1 | SCREW HHC M10-1.25 X 20 G8.8 |
| 6 | 051713 | 4 | WASHER FLAT M5 | 21 | 051769 | 6 | WASHER LOCK M12 |
| 7 | 022129 | 4 | WASHER LOCK M8-5/16 | 22 | 049541 | 4 | SCREW HHC M10-1.5 X 35 G8.8 |
| 8 | 098672 | 1 | ASSY STATOR 10KW A | 23 | 046526 | 4 | WASHER LOCK M10 |
| | 098673 | 1 | ASSY STATOR 10KW D | 24 | 045772 | 4 | NUT HEX M10-1.5 G8 YEL CHR |
| | 098674 | 1 | ASSY STATOR 10KW GJK | 25** | 082130B | 1 | ASSY MPU SPEED SENSOR 48" |
| | 098682 | 1 | ASSY STATOR 15KW 1PH A | 26* | 087599 | 1 | PLUG PLASTIC 3/8 CAPLUG #2 |
| | 098683 | 1 | ASSY STATOR 15KW 3PH D | 27 | 077043E | 1 | FLEX CONDUIT 1" BLCK (NOT SHOWN) |
| | 098684 | 1 | ASSY STATOR 15KW 1PH GJK | 28 | 022131 | 4 | WASHER FLAT 3/8 ZINC |
| | 098676 | 1 | ASSY STATOR 20KW 1PH A | 29 | 072578 | 1 | SPACER ROTOR SHAFT |
| | 098677 | 1 | ASSY STATOR 20KW 1PH A | 30 | 0A7043 | 5 | SCREW HHC M12-1.25 X 25 G8.8 |
| | 098678 | 1 | ASSY STATOR 20KW 1PH GJK | 31 | 049808 | 5 | WASHER FLAT M12 |
| | 097620 | 1 | ASSY STATOR 25KW 1PH A | 32 | 058589 | 1 | DECAL-WARNING |
| | 098937 | 1 | ASSY STATOR 25KW 1PH D | 33 | 023365 | 4 | WASHER SHAKEPROOF INT #8 |
| | 097621 | 1 | ASSY STATOR 25KW 1PH D | 35 | 0A8830 | 4 | WASHER FLAT .34ID X .75OD |
| 9 | 0A5382 | 1 | BEARING CARRIER REAR | | | | |
| 10 | 075591 | 1 | HOLDER, BRUSH ASSEM. | | | | |
| 11 | 052813 | 4 | SCREW HHC M4-0.7 X 20 G8.8 | | | | * USED ON PRE-PACKAGED UNITS ONLY |
| 12 | 0A5601 | 1 | COVER, REAR BEARING CARRIER | | | | ** USED ON "C" OPTION PANEL UNITS ONLY |

Section 8 - Exploded Views and Parts

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Natural Gas Fuel System – Drawing No. 0A9349-E



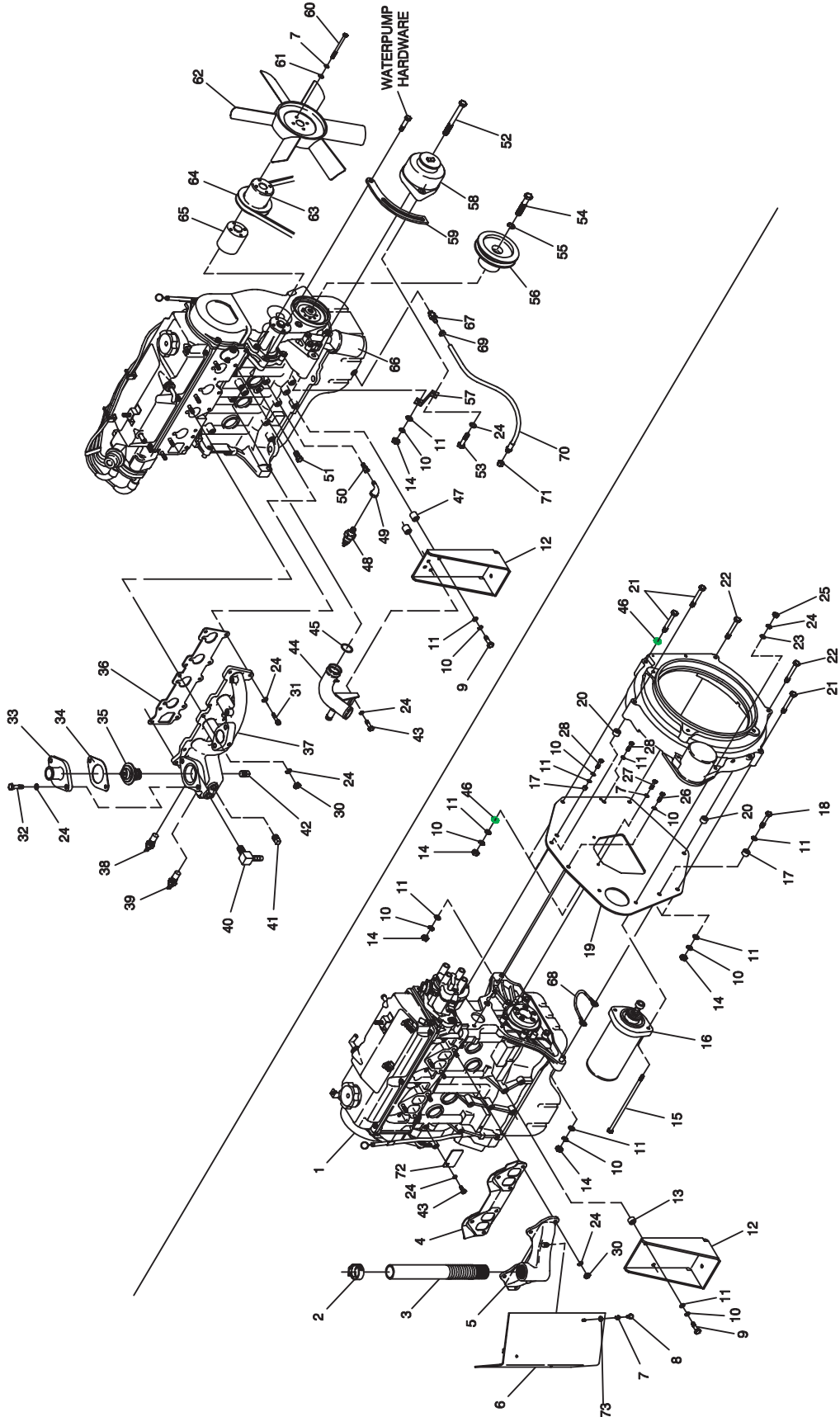
Section 8 - Exploded Views and Parts
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Natural Gas Fuel System – Drawing No. 0A9349-E



| ITEM | PART NO. | QTY. | DESCRIPTION |
|------|----------|--------|----------------------------------|
| 1 | 0C2632 | 1 | WELDMENT MOUNTING BASE |
| 2 | 075580 | 2 | FLANGE FUEL INLET |
| 3 | 026915 | 3 | NIPPLE CLOSE 3/4 X 1.375 |
| 4 | 039253 | 4 | SCREW HHC-M8-1.25 X 20 |
| 5 | 022145 | 5 | WASHER FLAT 5/16 ZINC |
| 6 | 022129 | 7 | WASHER LOCK M8-5/16 |
| 7 | 045771 | 4 | NUT HEX M8-1.25 G8 YEL CHR |
| 8 | 0A2666 | 2 | SOLENOID GAS FUEL |
| 9 | 046747 | 1 | BUSHING REDUCER 3/4 TO 3/8 |
| 11 | 0C3714 | 1 | ASSY HOSE NG/LPV.31" |
| 13 | 0A5547 | 1 | COVER AIR CLEANER |
| 14 | 0C1475 | 1 | REGULATOR NATURAL GAS EM |
| | 0A9911 | 1 | REGULATOR L.P. GAS EM |
| 15 | 0A7989 | 1 | NIPPLE PIPE 3/8 NPT X 4 BLK IRON |
| 16 | 0A6593 | 1 | ADAPTOR CARBURETOR |
| 17 | 059402 | 1 | FILTER ELEMENT |
| 18 | 037561 | 1 | NUT WING 1/4-20 NYLK |
| 19 | 059403 | 1 | CARBURETOR, CA55 EM |
| 20 | 059401 | 1 | GASKET CARBURETOR |
| 21 | 034154 | 4 | SCREW PHM 10-24 X 1/2 CAD |
| 22 | 022152 | 4 | WASHER LOCK #10 |
| 23 | 023897 | 4 | WASHER FLAT #10 ZINC |
| 24 | 062522 | 1 | STUD THR 1/4-20X3 F THR G2 ZNC |
| 25 | 022127 | 1 | NUT HEX 1/4-20 STEEL |
| 26 | 022259 | 2 | NUT HEX 5/16-18 STEEL |
| 27 | 050280 | 1 | DECAL FUEL INLET LPG |
| 28 | 0A6125 | 2 | STUD 5/16-18 X 1.25 F THR |
| 29 | 052219 | 1 | BARBED STR 1/8NPT X 5/16 |
| 30 | 048031C | 3 | CLAMP HOSE BAND 1/4 |
| 31 | 029032 | 6-1/2" | HOSE 9/32 ID |
| 32 | 029032 | 11" | HOSE 9/32 ID |
| 33 | 032552 | 1 | BARBED EL 90 5/16 X 1/8NPT |
| 34 | 0A4682 | 1 | MANIFOLD INTAKE 1.5 |
| 35 | 042907 | 1 | SCREW HHC M8-1.25 X 16 G8.8 |
| 36 | 055934D | 1 | CLAMP VINYL 1.06 X .406 Z |
| 37 | 0A7040 | 1 | BRACKET-RADIATOR HOSE |
| 38 | 0C3153 | 1 | TORX PLUS BHS M8 X 30 |

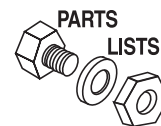
Section 8 - Exploded Views and Parts

**Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Engine Compartment – Drawing No. 0A7642-J**



Section 8 - Exploded Views and Parts

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Exploded View – Engine Compartment – Drawing No. 0A7642-J

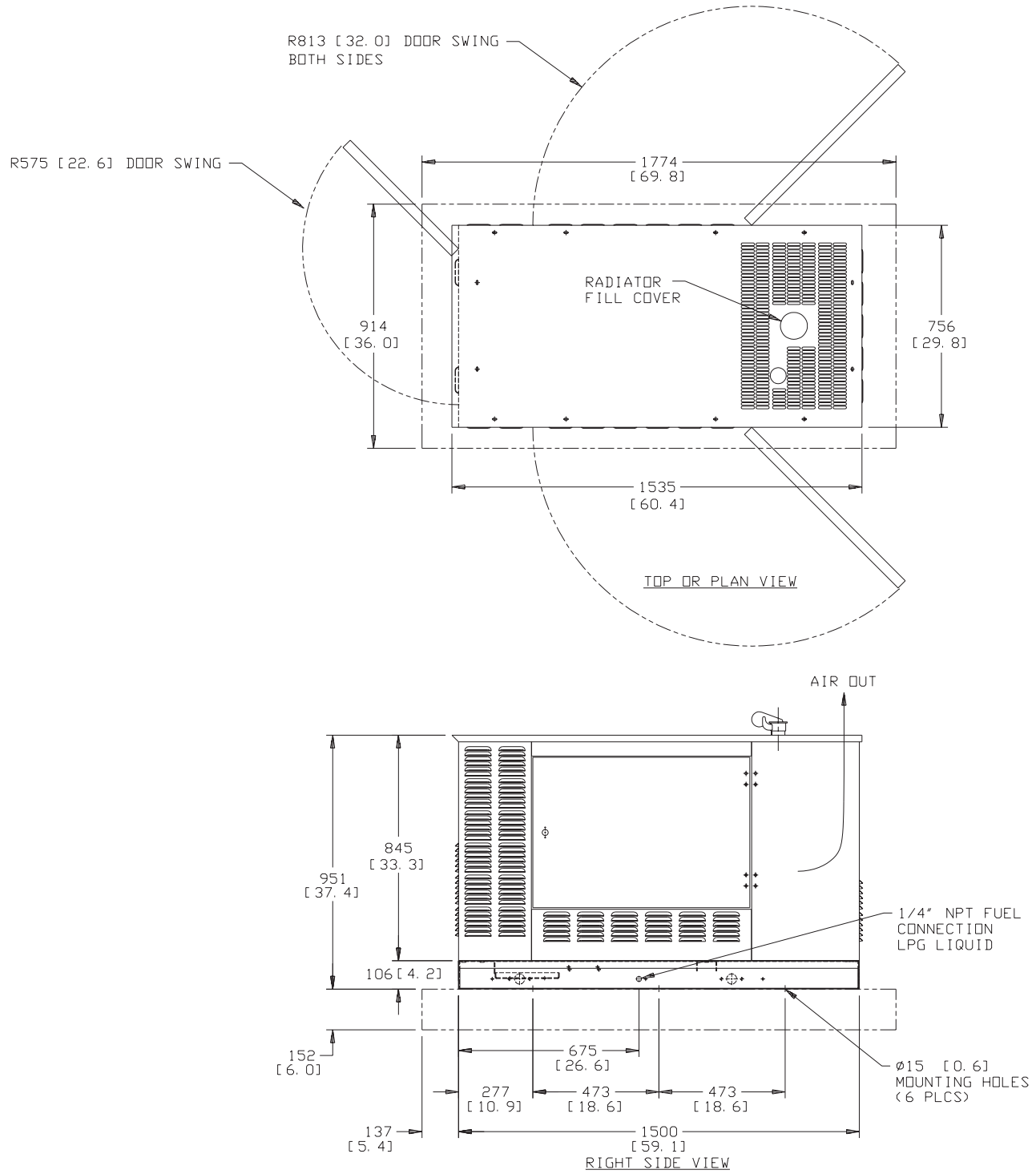


| ITEM | PART NO. | QTY. | DESCRIPTION | ITEM | PART NO. | QTY. | DESCRIPTION |
|------|------------|------|--------------------------------|------|------------|------|--------------------------------|
| 1 | 0A4531 | 1 | ENGINE-1.5L | 40 | 034339 | 1 | BARBED EL 90 3/8NPT X 5/8 |
| 2 | 035685 | 1 | CLAMP HOSE #28 1.32 - 2.25 | 41 | 026925 | 1 | PLUG STD PIPE 3/8 STEEL SQ HD |
| 3 | 075546A | 1 | PIPE-FLEX EXHAUST | 42 | 061012 | 1 | PLUG STD PIPE 1/8 SCKT HD |
| 4 | 0A45310258 | 1 | GASKET-EXHAUST MANIFOLD | 43 | 039253 | 6 | SCREW HHC M8-1.25 X 20 G8.8 |
| 5 | 0A4355 | 1 | MANIFOLD-EXHAUST | 44 | 0A5110 | 1 | PIPE WATER-INLET |
| 6 | 0A6699 | 1 | SHIELD HEAT EXHAUST | 45 | 0A7006 | 1 | O-RING 1-1/16X1-5/16X1/8 |
| 7 | 022097 | 8 | WASHER LOCK M6-1/4 | 46 | 025507 | 2 | WASHER SHAKEPROOF EXT 7/16 STL |
| 8 | 022507 | 2 | SCREW HHC 1/4-20 X 1/2 G5 | 47 | 022500B | 2 | SPACER .41X.75X.25 ST/ZNC |
| 9 | 052212 | 4 | SCREW HHC M10-1.25 X 25 G8.8 | 48 | 0A8584 | 1 | SWITCH OIL PRESSURE |
| 10 | 046526 | 14 | WASHER-LOCK-M10 | 49 | 036277 | 1 | ELBOW 90D STREET 1/8 |
| 11 | 022131 | 16 | WASHER FLAT 3/8 ZINC | 50 | 042574 | 1 | ADAPTOR 1/8NPTF TO 1/8-28 |
| 12 | 0C2499 | 2 | STAMPING ENG FOOT | 51 | 026073A | 1 | PLUG STD PIPE 1/4 STEEL SQ HD |
| 13 | 055993 | 1 | SPACER .41 X .75 X .12 STL/ZNC | 52 | 0A6701 | 1 | SCREW HHC M10-1.5 X 110 G8.8 |
| 14 | 045772 | 4 | NUT HEX M10-1.5 G8 YEL CHR | 53 | 039414 | 1 | SCREW HHC M8-1.25 X 35 G8.8 |
| 15 | 023586 | 2 | SCREW SHC 5/16-18 X 2 G8.8 NZ | 54 | 0A5568 | 1 | SCREW HHC M12-1.25 X 55 G8.8 |
| 16 | 020692 | 1 | STARTER-12V | 55 | 051769 | 1 | WASHER LOCK M12 |
| 17 | 0A7005 | 2 | SPACER .56 X 1 X .37 ST/ZNC | 56 | 0A4804 | 1 | PULLEY-CRANKSHAFT (1800 RPM) |
| 18 | 052243 | 1 | SCREW HHC M10-1.5 X 60 G8.8 | | 0A4800 | 1 | PULLEY-CRANKSHAFT (3600 RPM) |
| 19 | 0A4772 | 1 | ENGINE PLATE | 57 | 0A5839 | 1 | BRACKET - ALT SUPPRT |
| 20 | 070901 | 2 | SLEEVE DOWEL BLHSG | 58 | 0A1354B | 1 | DC ALTERNATOR-12V |
| 21 | 051735 | 3 | SCREW HHC M10-1.5 X 70 G8.8 | 59 | 0A4839 | 1 | ARM ADJUST ALTERNATOR |
| 22 | 056768 | 2 | SCREW HHC M10-1.5 X 90 G8.8 | 60 | 055816 | 4 | SCREW HHC M6-1.0 X 70 G8.8 |
| 23 | 022145 | 2 | WASHER FLAT 5/16 ZINC | 61 | 049811 | 4 | WASHER FLAT M6 |
| 24 | 022129 | 23 | WASHER LOCK M8-5/16 | 62 | 075614 | 1 | FAN ENG PUSHER 6/380 |
| 25 | 022259 | 2 | NUT HEX 5/16-18 STEEL | 63 | 0A2628 | 1 | PULLEY - FAN 95 DIA |
| 26 | 052213 | 1 | SCREW HHC M10-1.25 X 20 G8.8 | 64 | 0A5275 | 1 | V-BELT 3/8 X 32-1/8 1.5L |
| 27 | 047411 | 2 | SCREW HHC M6-1.0 X 16 G8.8 | | 0A5586 | 1 | V-BELT 3/8 X 28.9 1.5L |
| 28 | 052830 | 2 | SCREW HHC M10-1.25 X 45 G8.8 | 65 | 0A4814 | 1 | SPACER PULLEY |
| 30 | 045771 | 10 | NUT HEX M8-1.25 G8 YEL CHR | 66 | 0A45310244 | 1 | FILTER OIL |
| 31 | 058306 | 5 | SCREW SHC M8-1.25 X 25 G12.9 | 67 | 0C1852 | 1 | ADAPTER DRAIN OIL |
| 32 | 030795 | 2 | SCREW HHC 5/16-18 X 1 G5 | 68 | 0912970066 | 1 | GROUND WIRE (STARTER) |
| 33 | 0A2711A | 1 | ADAPTER-THERMOSTAT | 69 | 070928 | 1 | CLAMP HOSE - OIL DRAIN |
| 34 | 048665 | 1 | GASKET THERMOSTAT | 70 | 069860C | 1 | HOSE ASM.-OIL DRAIN |
| 35 | 075885 | 1 | THERMOSTAT 195 DEG | 71 | 069811 | 1 | CAP HEX 1/4NPT BRASS |
| 36 | 0A45310257 | 1 | GASKET INLET MANIFOLD | 72 | 0A5317 | 1 | NAMEPLATE ENGINE |
| 37 | 0A4682 | 1 | MANIFOLD-INTAKE | 73 | 022473 | 2 | WASHER FLAT 1/4 ZINC |
| 38 | 057522 | 1 | SENSOR COOLANT LEVEL | | | | |
| 39 | 0A6751 | 1 | SW-TMP 245DEG 3/8NPT | | | | |

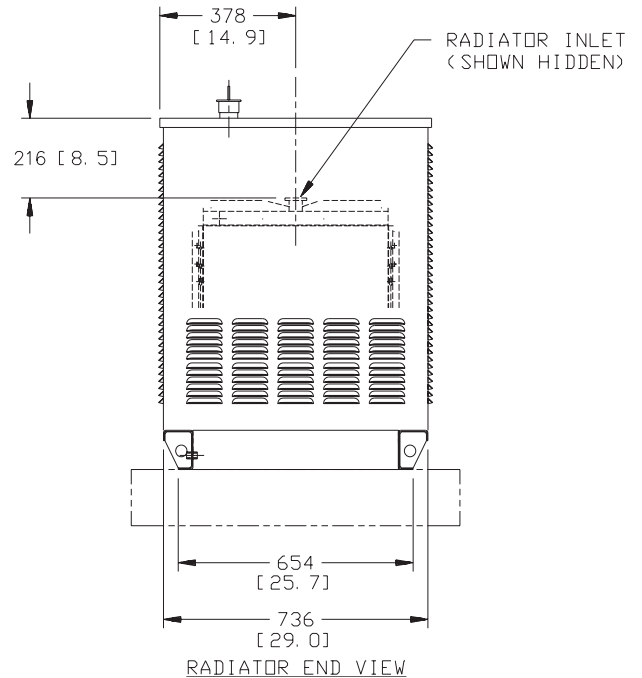
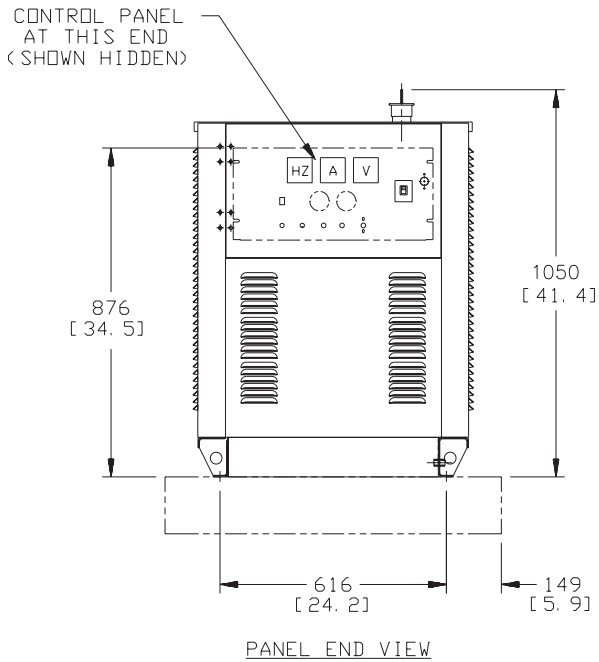
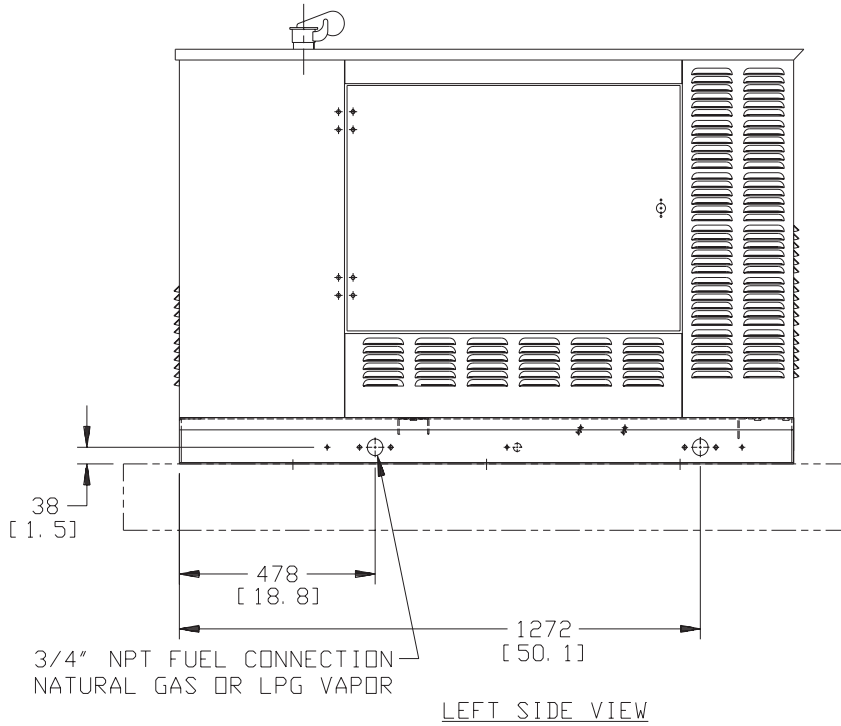
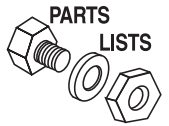


Section 9 – Installation

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators Installation Drawing – Drawing No. 0C1450



Section 9 – Installation
Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators
Installation Drawing – Drawing No. 0C1450





Section 10 – Warranty

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

CALIFORNIA EMISSION CONTROL WARRANTY STATEMENT

YOUR WARRANTY RIGHTS AND OBLIGATIONS

The California Air Resources Board (CARB) and Generac Power Systems, Inc. (Generac) are pleased to explain the Emission Control System Warranty on your new engine.* In California, new utility, and lawn and garden equipment engines must be designed, built and equipped to meet the state's stringent anti-smog standards. Generac will warrant the emission control system on your engine for the periods of time listed below provided there has been no abuse, neglect, unapproved modification or improper maintenance of your engine.

Your emission control system may include parts such as the carburetor, ignition system and exhaust system. Generac will repair your engine at no cost to you for diagnosis, replacement parts and labor, should a warrantable condition occur.

MANUFACTURER'S EMISSION CONTROL SYSTEM WARRANTY COVERAGE:

Emissions control systems on 1995 and later model year engines are warranted for two years as hereinafter noted. If, during such warranty period, any emission-related component or system on your engine is found to be defective in materials or workmanship, repairs or replacement will be performed by a Generac Authorized Warranty Service Facility.

PURCHASER'S/OWNER'S WARRANTY RESPONSIBILITIES:

As the engine purchaser/owner, you are responsible for the completion of all required maintenance as listed in your factory supplied *Owner's Manual*. For warranty purposes, Generac recommends that you retain all receipts covering maintenance on your engine. However, Generac cannot deny warranty solely due to the lack of receipts or for your failure to ensure the completion of all scheduled maintenance.

As the engine purchaser/owner, you should, however, be aware that Generac may deny any and/or all warranty coverage or responsibility if your engine, or a part/component thereof, has failed due to abuse, neglect, improper maintenance or unapproved modifications, or the use of counterfeit and/or "grey market" parts not made, supplied or approved by Generac.

You are responsible for presenting your engine to a Generac Authorized Warranty Service Facility as soon as a problem occurs. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

Warranty service can be arranged by contacting either your selling dealer or a Generac Authorized Warranty Service Facility. To locate the Generac Authorized Warranty Service Facility nearest you, call our toll-free number:

1-800-333-1322

IMPORTANT NOTE: This warranty statement explains your rights and obligations under the Emission Control System Warranty (ECS Warranty), which is provided to you by Generac pursuant to California law. See also the "Generac Limited Warranties for Generac Power Systems, Inc.," which is enclosed herewith on a separate sheet, also provided to you by Generac. The ECS Warranty applies **only** to the emission control system of your new engine. If there is any conflict in terms between the ECS Warranty and the Generac Warranty, the ECS Warranty shall apply except in circumstances where the Generac Warranty may provide a longer warranty period. Both the ECS Warranty and the Generac Warranty describe important rights and obligations with respect to your new engine.

Warranty service can be performed only by a Generac Authorized Warranty Service Facility. When requesting warranty service, evidence must be presented showing the date of the sale to the original purchaser/owner.

If you have any questions regarding your warranty rights and responsibilities, you should contact Generac at the following address:

**ATTENTION WARRANTY DEPARTMENT
GENERAC POWER SYSTEMS, INC.
P.O. BOX 8
WAUKESHA, WI 53187**

Part 1



EMISSION CONTROL SYSTEM WARRANTY

Emission Control System Warranty (ECS Warranty) for 1995 and later model year engines:

- (a) **Applicability:** This warranty shall apply to 1995 and later model year engines. The ECS Warranty Period shall begin on the date the new engine or equipment is purchased by/delivered to its original, end-use purchaser/owner and shall continue for 24 consecutive months thereafter.
- (b) **General Emissions Warranty Coverage:** Generac warrants to the original, end-use purchaser/owner of the new engine or equipment and to each subsequent purchaser/owner that each of its engines is ...
- (1) Designed, built and equipped so as to conform with all applicable regulations adopted by the CARB pursuant to its authority, and
 - (2) Free from defects in materials and workmanship which, at any time during the ECS Warranty Period, may cause a warranted emissions-related part to fail to be identical in all material respects to the part as described in the engine manufacturer's application for certification.
- (c) The ECS Warranty only pertains to emissions-related parts on your engine, as follows:
- (1) Any warranted, emissions-related parts that are not scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the ECS Warranty Period. If any such part fails during the ECS Warranty Period, it shall be repaired or replaced by Generac according to Subsection (4) below. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.
 - (2) Any warranted, emissions-related part that is scheduled only for regular inspection as specified in the *Owner's Manual* shall be warranted for the ECS Warranty Period. A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the ECS Warranty Period. Any such part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period.
 - (3) Any warranted, emissions-related part that is scheduled for replacement as required maintenance in the *Owner's Manual* shall be warranted for the period of time prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by Generac according to Subsection (4) below. Any such emissions-related part repaired or replaced under the ECS Warranty shall be warranted for the remainder of the ECS Warranty Period prior to the first scheduled replacement point for such emissions-related part.
 - (4) Repair or replacement of any warranted, emissions-related part under this ECS Warranty shall be performed at no charge to the owner at a Generac Authorized Warranty Service Facility.
 - (5) When the engine is inspected by a Generac Authorized Warranty Service Facility, the owner shall not be held responsible for diagnostic costs if the repair is deemed warrantable.
 - (6) Generac shall be liable for damages to other original engine components or approved modifications proximately caused by a failure under warranty of any emission-related part covered by the ECS Warranty.
 - (7) Throughout the ECS Warranty Period, Generac shall maintain a supply of warranted emission-related parts sufficient to meet the expected demand for such emission-related parts.
 - (8) Any Generac authorized and approved emission-related replacement part may be used in the performance of any ECS Warranty maintenance or repairs and will be provided without charge to the owner. Such use shall not reduce Generac ECS Warranty obligations.
 - (9) Unapproved, add-on, modified, counterfeit and/or "grey market" parts may not be used to modify or repair a Generac engine. Such use voids this ECS Warranty and shall be sufficient grounds for disallowing an ECS Warranty claim. Generac shall not be held liable hereunder for failures of any warranted parts of a Generac engine caused by the use of such an unapproved, add-on, modified, counterfeit and/or "grey market" part.

EMISSION RELATED PARTS INCLUDE THE FOLLOWING:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1) Fuel Metering System: 1.2) LPG/Natural Gas carburetion assembly and its internal components. <ol style="list-style-type: none"> a) Fuel controller (if so equipped) b) Mixer and its gaskets (if so equipped) c) Carburetor and its gaskets (if so equipped) d) Primary gas regulator (if so equipped) e) LP liquid vaporizer (if so equipped) 2) Air Induction System including: <ol style="list-style-type: none"> a) Intake pipe/manifold b) Air cleaner | <ol style="list-style-type: none"> 3) Ignition System including: <ol style="list-style-type: none"> a) Spark plug b) Ignition module 4) Catalytic Muffler Assembly (if so equipped) including: <ol style="list-style-type: none"> a) Muffler gasket b) Exhaust manifold 5) Crankcase Breather Assembly including: <ol style="list-style-type: none"> a) Breather connection tube |
|---|---|

*Generac engine types covered by this warranty statement include the following:

- 1) Prepackaged Standby Generator
- 2) Auxiliary Power Unit (APU) Generator
- 3) Standby Generator



Section 10 – Warranty

Guardian Liquid-cooled 10 kW, 15 kW, 20 kW and 25 kW Generators

GENERAC'S STANDARD ONE-YEAR LIMITED WARRANTY FOR STANDBY POWER SYSTEMS

For a period of one year or 1,500 hours of operation from the date of original sale, whichever occurs first, Generac Power Systems, Inc. (Generac) will, at its option, repair or replace any part which, upon examination by Generac or a Generac/Guardian Authorized Warranty Service Facility, is found to be defective under normal use and service, in accordance with the warranty schedule set forth below. Any equipment that the purchaser/owner claims to be defective must be returned to and examined by the nearest Generac/Guardian Authorized Warranty Service Facility. All transportation costs under the warranty, including return to the factory, are to be borne and prepaid by the purchaser/owner. This warranty applies only to generators used in "Standby" applications, as Standby has been defined by Generac, provided said generators have been initially installed and inspected on-site by a Generac/Guardian Authorized Service Dealer or branch thereof.

WARRANTY SCHEDULE

YEAR ONE – 100 percent coverage on mileage*, labor and parts listed:

- **Engine** – All components
- **Alternator** – All components
- **Transfer System** – All components

**Travel allowance is limited to 300 miles or 7.5 hours, whichever occurs first, and applies only to permanently wired and mounted units.*

All warranty expense allowances are subject to the conditions defined in Generac's *Warranty Policies, Procedures and Flat Rate Manual*.

Units that have been resold are not covered under the Generac warranty, as this warranty is not transferable.

THIS WARRANTY SHALL NOT APPLY TO THE FOLLOWING:

1. Costs of normal maintenance, adjustments, installation and start-up.
2. Units sold, rated or used for "Prime Power" applications as Prime Power has been defined by Generac. Contact a distributor for Prime Power definition and warranty.
3. Failures due to (a) normal wear and tear, or (b) accident, misuse, abuse, negligence or improper installation.
4. Products that are modified or altered in a manner not authorized by Generac in writing.
5. Any incidental, consequential or indirect damages caused by defects in materials or workmanship, or any delay in repair or replacement of the defective parts.
6. Failure due to misapplication.
7. Telephone, telegraph, teletype or other communication expenses.
8. Living or travel expenses of persons performing service, except as specifically included within the terms of a specific unit warranty.
9. Rental equipment used while warranty repairs are being performed.
10. Overtime labor.
11. Starting batteries, fuses, light bulbs and engine fluids.

THIS WARRANTY IS IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. SPECIFICALLY, GENERAC MAKES NO OTHER WARRANTIES AS TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

GENERAC'S ONLY LIABILITY SHALL BE THE REPAIR OR REPLACEMENT OF PARTS AS STATED ABOVE. IN NO EVENT SHALL GENERAC BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, EVEN IF SUCH DAMAGES ARE A DIRECT RESULT OF GENERAC'S NEGLIGENCE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation may not apply to you. Purchaser/owner agrees to make no claims against Generac based on negligence.

This warranty gives you specific legal rights. You also may have other rights that vary from state to state.

GENERAC® POWER SYSTEMS, INC.

P.O. BOX 8
WAUKESHA, WI 53187